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HIGH EXPLOSIVES AND INTRENCHING TOOLS IN THEIR RELATIONS TO CAVALRY.

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IN order that our cavalry may fulfill three of its most important functions in war, an additional equipment would seem to be not only desirable but absolutely necessary. The uses of the mounted arm referred to are: 1st. The holding of an important defensive position until the arrival of our infantry and field artillery (horse artillery would usually accompany the cavalry); 2d. To assume successive defensive positions beyond a retreating enemy or as rear guard during a retreat of our own forces, thus compelling the enemy to deploy and attack; 3d. The quick destruction of masonry or iron truss bridges, canal locks, railroads, tunnels, reservoirs or telegraph lines.

These various uses of cavalry are contemplated in several paragraphs of our Drill Regulations, under "Employment of Cavalry," which read as follows:

"§969. To occupy distant and important points and hold them against the enemy until the arrival of infantry. During a retreat to offer resistance to compel the enemy to deploy, thus gaining time.

"§970. In the pursuit a portion of the cavalry may be dismounted to take up and strengthen positions on the enemy's line of retreat, acting as a delaying force while other portions go farther on and take up other positions. When a delaying force is compelled to give way, it is mounted and taken to another position beyond those of the delaying forces that have preceded.

"§973. *Raids.*—To threaten, interrupt and destroy his communications, to destroy his depots and source of supplies."

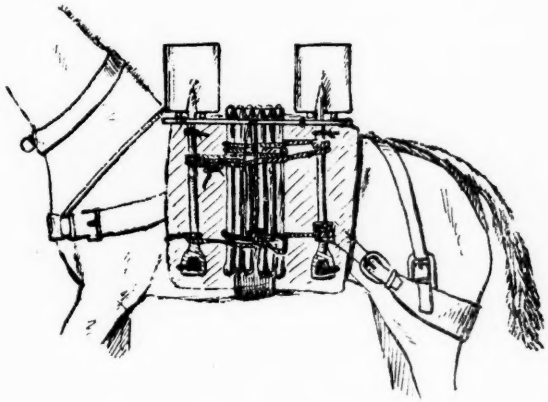
Drill Regulations further state that these operations should not be undertaken with a smaller force than a regiment or a squadron.

In the event of our own nation becoming involved in a war, that combatant who is best prepared and moves first has a certain great advantage, physical and moral, over his opponent. The first consideration in which we of the cavalry would be vitally interested, would undoubtedly be to quickly secure and hold certain advantageous points in the enemy's territory (the location of which are well known) pending the arrival of sufficient reënforcements to hold them; the second would probably involve the interruption of certain important lines of supply and communication. To accomplish the first successfully an intrenching tool of some description would be an important addition to the equipment; for there is no difference of opinion as to the immense advantage afforded by well made shelter trenches when a body of troops comparatively weak in numbers are to act solely on the defensive. As for the second, the result of a raid in the vicinity of an active enemy, in so far at least as demolitions are concerned, would be more than problematical without a supply of high explosives and an accurate knowledge of how and where to use them.

It is with the desire of inducing a discussion on these important points that this article is written.

With all foreign nations it is a maxim that infantry should be equipped with some form of light intrenching tool carried by the soldier, nor is their cavalry entirely exempt, although the carrying of an intrenching tool by the trooper is the exception and not the rule. The objection, and a sound one too, is made at the start, that our cavalry horses have enough to carry already without the additional burden of even a light pick or shovel. This is admitted. The same objection applies to the carrying of high explosives by the trooper, so that the first requisite (assuming without further argument that the equipment mentioned is necessary) would seem to be a suitable light cart or an aparejo adapted to the purpose. Whatever form of cart or wagon is used for transporting ammunition, it

can in all probability be improvised for the tools and explosives as well, but the trouble begins at that epoch common to all rapid and long continued cavalry marches, when the wagon train cannot keep up, and the expedition must proceed with packs. The explosives can be readily packed in the same manner that ammunition boxes are, two to a mule, but only those who have experienced it know how exasperating it is to pack any considerable number of shovels, picks or axes on the ordinary aparejo. To obviate this a specially devised pack saddle, somewhat on the plan shown in the cut, might be gotten up, which it is thought would fulfill all requisite conditions, relieve the trooper from carrying additional weight, be quickly available in case of need, and be always up with the column, whether



mounted or on foot, for a mule can be taken wherever a footman can go. One pack mule, assuming the weight of cargo to be only 150 pounds, can carry twenty-four short handled shovels and twelve picks (the handle of the latter reduced eight inches in length), or equipment in that line sufficient for a squadron. The advantage to be gained in weight by carrying a light intrenching tool would not compensate for the immense advantage the regular sized tools have in lifting capacity and ease of handling. Before passing from this branch of the subject to that of high explosives, it is to be noted that while our troopers are sufficiently expert in handling the pick and shovel, their officers will be looked to for such knowledge of how, when and where to lay out hasty intrenchments, that the labor expended may be utilized to the best advantage. Soldiers will stand physical hardship to the verge of endurance uncomplainingly if

they believe their labor is needful and properly directed, and not otherwise.

Conceding then that our troopers are sufficiently expert with intrenching tools, and that their officers are fully qualified to direct them, is it not, on the contrary, an indisputable fact that the handling, care and use of high explosives is becoming one of the lost arts among us? Should we not as a body turn our attention to this important subject, instead of waiting till circumstances and ignorance compel us either to take unnecessary risks or to use useless caution, which latter under some conditions might be equally as fatal? Our motto should be, "Familiarity with and a practical knowledge of whatever pertains to the cavalry arm." Suppose, for example, the brigade or regimental commander is ordered to destroy a certain bridge or culvert in an enemy's country. Its importance and the time necessary to replace it would very likely be proportioned to the care with which it would be guarded, so that a fight for its possession would be one of the probabilities. The force guarding the bridge being intrenched, the brigade commander might decide that a stormy night would afford better chances for success, in view of the fact that all he requires is temporary possession. Having obtained possession, the work of destruction is but the occupation of a few minutes, provided he has the proper explosives. Gunpowder under the circumstances would be well nigh useless owing to its great bulk as compared to explosive effect. Gun cotton or dynamite in several separate charges fired simultaneously would be absolutely necessary unless chances of failure are to be incurred. To explode several charges at once makes an electrical exploder an absolute necessity. The entire operation as to handling the explosive, properly placing it and detonating it could be quickly learned; but the lack of this little knowledge might prove fatal to the expedition. Lack of opportunity, of course, debars most officers from acquiring this knowledge, and will continue to do so until the high explosive, whatever it may be, is supplied to regiments as other necessary material is.

To examine into the details of the various explosives, as regards their keeping qualities and care required in handling, as well as their relative strengths is believed will be of advantage in deciding which of the many is best adapted to our needs.

Explosives are classed under two general heads of mechanical mixtures, such as gunpowder; or chemical compounds, such as gun cotton, nitro-glycerine and dynamite. The first or weaker class are slow burning mixtures, their effect being to rend or tear apart what-

ever confines them; the second in which ignition of the entire mass may be said to be simultaneous, has a shattering effect on objects in contact. The common and apparently mysterious effect of the latter class of explosives, acting downward when in the open air more violently than upward, is explained by the force of the explosion taking the line of least resistance, the weight of the surrounding air actually offering greater resistance to the intensely violent shock than the more solid mass below. In powders the combustion is progressive, but in the chemical compounds the ignition is instantaneous throughout the mass, so that the initial pressure is the maximum one.

For reasons at once apparent, chemical compounds are the best suited to military work involving demolition; the effect desired is to shatter not rend, while at the same time weight and bulk are greatly in its favor.

The composition, keeping qualities and explosive effects of common gunpowder are too well known to be referred to, whereas similar data as to the so-called high explosives are more or less of a mystery to our mounted service, for the very simple reason that we are never required to handle or use them.

The familiarity of the miner with his sticks of dynamite, fostered by daily use year after year, engenders in him a contempt for the few ordinary precautions laid down for its handling and care; he continues to thaw it out in his oven because he has done so scores of times with perfect safety, until finally another addition to the long list of accidents fills the novice who reads of it with a greater dread of the stuff than ever. There *is* danger in handling dynamite; there is also danger, probably equally as great, in handling small arm fixed ammunition with its fulminate of mercury primer in contact with the powder, and yet who ever gives the latter a thought. It would seem the policy of wisdom to require at least the officers of our mounted service to familiarize themselves with the handling, care and usefulness of the more common nitro-compounds, so that this essential to a perfect mounted service will not have to be entrusted to civilians. Telegraphy among our officers has been more or less of a fad for the past fifteen years, and yet, in the event of war, our government could hire a thousand skilled civilian operators where it could not hire ten men skilled in handling high explosives and using them intelligently in demolishing railroads, bridges or canal locks.

Nitro-glycerine, which is said to be the most powerful explosive known to man, results from a reaction which takes place when

glycerine is subjected to the action of nitric acid; it has eight times the explosive force of an equal weight of gunpowder, and may be fired by detonators or blasting caps, they being immersed in the liquid. Pure nitro-glycerine is not affected by friction or ordinary percussion, although it may be exploded by a violent blow; if it contains any free acid, decomposition is liable to occur, and this tendency is increased in hot weather, with liability to violent explosion; it is safest for handling when frozen. The presence of free acid may be very readily detected by litmus paper, but owing to its liability to this decomposition, and the fact that high temperatures and rough handling may often occur, this compound is undesirable as a military explosive.

Allied to nitro-glycerine chemically, but entirely different from it in appearance, is gun cotton. This is made by dipping dry cotton into a mixture of nitric and sulphuric acids and afterwards washing thoroughly in water. This explosive having been adopted in 1883 by our navy as a service high explosive, in the form of compressed discs, it was decided to manufacture it at the U. S. Naval Torpedo Station, so a plant was established there the following year, and now every ship in commission is supplied with it.

Gun cotton in its natural state differs little in appearance from ordinary cotton; it burns in the air with a flash, but does not explode. Shells filled with compressed discs have been fired from a twenty-four-pounder gun against a masonry wall, shattering the shell, but failing to explode the gun cotton. Dry discs of the cotton burn slowly, and a wet one, if placed in a fire, will burn from the outside as it gradually dries. It is stated that at the Naval Torpedo Station as much as 2,000 pounds of wet gun cotton has been put into a bonfire, where it was slowly consumed.

Gun cotton, in disc form, is packed while wet in cans, which are then sealed. In this condition, providing of course the proper care has been exercised in its manufacture, it is probably the safest of all high explosives. It can be raised to a comparatively high temperature without harming it, and water is a perfect protection to it if kept in the dark, as in the packing cans. Freezing does not affect it in its dry state, and the freezing and thawing of wet gun cotton, while somewhat reducing its usefulness, in no wise increases the danger of handling. Gun cotton is readily detonated by means of a primer; the explosive force when wet being greater than when dry, it is necessary in the first instance to have a small quantity of dry in contact with the primer. Gun cotton has about twice the

explosive force of gunpowder when both are tamped; untamped, it has about four times the force.

Much uncertainty has prevailed, up to quite a recent date, as to the keeping qualities of gun cotton. The Austrian government, after using it twelve years, finally rejected it on account of its instability, and some of the other powers did the same. The reason for its deterioration is now definitely known to be due to its former method of manufacture, whereby some of the free acid still remained in the compound. This defect is now entirely done away with in the prolonged and thorough washing given to the cotton after its treatment with the nitric acid.

Tonite is a gun cotton powder mixed with nitrate of barium. It is whitish in appearance, and is put up by the Tonite Powder Company, of San Francisco, in cartridges weighing from a quarter to three-quarters of a pound each, the covering being coated with paraffine to render it water-proof. It is said to be as safe as the gun cotton, from which it is made, and is not sensitive to percussion or friction. Experiments with it show that it will not explode upon the impact of a service rifle bullet, and that it requires an unusually strong detonator, such as the tonite cap furnished by the company, to explode it. It is said to resist to a remarkable degree the extremes of climate, and is about four-fifths as powerful as gun cotton.

The various forms of dynamite with which the market is flooded, such as giant powder, atlas powder, dualin, rend rock, forcite, explosive gelatine, etc., are all made by the absorption of nitro-glycerine in some porous substance, the explosive not being turned into a solid, but merely held in the pores of the absorbent by the force of capillary attraction.

The absorbent originally used was kieselguhr, an infusorial earth commonly known as tripoli or rotten stone; now, many other absorbents, such as charcoal, cannel coal, wood fibre, sawdust, white sugar and chalk, have been adopted on account of some real or fancied superiority.

Dynamite No. 1 is a mixture of one part kieselguhr and three parts, by weight, of nitro-glycerine. It is a granular substance, of a gray or reddish-brown color, and when properly made has no tendency to "leak;" that is, to exude nitro-glycerine in a liquid state unless subjected to a very high temperature. Dynamite freezes at about 40° F., in which state it is almost impossible to explode it. Small quantities of it in its ordinary state will burn in the air without explosion, while a fire in a large mass of it almost invariably causes detonation. Most of the accidents with dynamite occur in

thawing it out after freezing, it being rashly assumed that because a stick of it can be burned with reasonable safety in the air, it will do no harm to heat it before a fire or in an oven. The thawing may be done in a warm room or in a can immersed in hot water with perfect safety, but the other methods are always dangerous.

A consensus of opinion among scientists, makers of this explosive, and transportation companies, warrants the conclusions that dynamites are the most powerful of all disrupting agents now in general use; that they are the safest of all explosives both in transportation and use (many times safer than gunpowder), and that there is no good reason why, under proper regulations, they should not be transported as freely in public conveyances as ordinary merchandise.

The approximate relative strength of the explosives described is as follows:

Nitro-glycerine	120.3
Gun cotton	100.
Dynamite No. 1 (75 per cent. nitro-glycerine)	97.8
Dynamite 50 per cent	72.7

The manner of exploding these compounds is invariably by means of detonators, which are copper tubes of about twice the

Figure 1.

Figure 2.

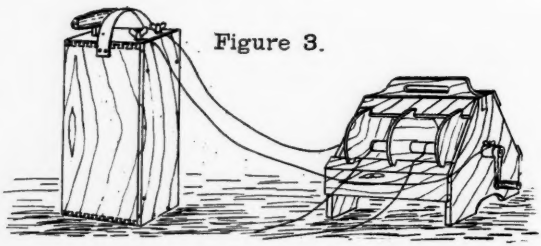


Figure 3.

thickness of a friction primer, filled with fulminate of mercury. The ordinary blasting cap or detonator (Fig. 1) is fired by a fuse and contains three, six or nine grains of the fulminate as desired. The electrical fuses and detonators are so constructed that ignition takes place upon the passage of a current of electricity through a

fine platinum wire, around which is wrapped some gun cotton (Fig. 2). The means now employed to furnish the current and the one giving the surest results, is the magneto machine. The Laflin & Rand exploder No. 3, (shown in Fig. 3) is the variety used at the Infantry and Cavalry School. It is cased in hard wood; is $13 \times 8 \times 5\frac{1}{2}$ inches, and weighs eighteen pounds. When the charge is to be fired the connecting wires are attached to the two binding posts on top of the box, the handle is then drawn out to its full extent and thrust downward with a rapid motion. On reaching the bottom of the box, the current generated by the small dynamo inside is sent through the wire, several hundred feet of which have been unreeled, with the result of exploding the detonator and thereby the charge; this machine will explode twelve detonators simultaneously.

As to the choice between a fuse and an electrical machine for exploding the detonator, there can be no difference of opinion, but there may be as to the explosive. Dynamite being the easiest to obtain, as well as being cheap and sure in action, has much to recommend it, but it is thought that gun cotton should be the explosive adopted on account of greater strength, its greater safety (dynamite No. 1 approaching too closely to the "leaky" stage), and the lower temperature required to freeze the water packing, and the fact that the U. S. Naval Torpedo Station could easily furnish it in such quantities as our cavalry might require.

As to the advisability of equipping our cavalry in time of peace with the weapons it will have to use in war, there can be no question. A glance at the corresponding equipment of cavalry of other nations may supply useful suggestions:

FRANCE.

	Shovels.	*Picks.*	*Hatchets.*	*Pincers.*	*Saws.*	*Small Picks.*	*Bill Hooks.*
Battalion of Chasseurs.....	182	68	30	.....	5	16	1

ENGLAND.*

	Shovels.	*Spades.*	*Picks.*	*Crowbars.*	*Axes.*	*Bill Hooks.*	*Hand Saws.*	*Sand Bags.*	*Gun Cotton.*
Cav. Regiment, 4 Squadrons..	40	8	48	8	20	32	4	160	192 lbs.
Cav. Brigade, 3 Regiments...	120	24	144	24	60	96	12	480	576 lbs.

*Ordinary camp equipment tools not included.

PRUSSIA.*

	Shovels.	Axes.	Bags of Tools, with Wrenches, Hammers, and Chisels.	Augers.	Belt and Climbers, Telegraph.	Silver Wire.	Gun Cotton.	Detonators.
Pioneers of each Sq'dron..	8	12	2	2	1	Spool	4 discs	1 case

*Ordinarily carried in wagons, but on expeditions on the saddle.

PRUSSIA.

	Sledges.	Hammers.	Wrenches.	Pincers.	Pliers.	Crowbars.	Augers.	Dynamite Cartridges.
Independent Cavalry Division.....	4	4 large 12 small	16 large 12 small	6	4	2	12	480

In Bavaria four men per squadron are equipped as pioneers, one of whom must be a carpenter. They are placed in the rear rank, and, if necessary, a fifth is added to hold their horses. Their arms consist of swords and revolvers. The tools with which they are provided are distributed as follows:

Pioneer No. 1.—Ax in case; bag containing one chisel, one pair pincers, one auger and handle, two gimlets, one measuring rule and eight feet of rope.

Pioneer No. 2.—Shovel and hand saw in case; bag containing one file, two clamps, twenty spikes and eight feet of rope.

Pioneer No. 3.—Shovel and hatchet in case; bag containing one clamp, ten spikes and thirty-two feet of rope.

Pioneer No. 4.—Pickax in case; bag containing one clamp, ten spikes and thirty-two feet of rope.

In the Saxon cavalry six troopers per squadron are equipped and trained as pioneers, being armed with swords and revolvers.

Foreign services, profiting by an experience learned by another, have been quick to grasp the immense advantage a raiding column possesses in the earliest stages of a war. To carry out the idea to its fullest extent, their cavalry is prepared by training and by equipment to make demolitions and interrupt communications in the quickest and most effective manner.

In the German regulations for the employment of cavalry in pioneer duty, occurs the following:

"The various duties imposed upon cavalry in the field demand that it should be trained to a high degree of independence. Dependence on the other arms checks rapidity of action and invites surprise, thereby depriving cavalry of an important factor to success.

"Cavalry must be able to prosecute works of demolition and destruction in connection with railways, telegraph lines and other means of communication. As such operations will sometimes have to be carried out in presence of an enemy, and, as a general rule, in a very limited space of time, thorough previous training will be indispensable.

"The pioneer detachment attached to a cavalry division will consist of one officer, one sergeant, two corporals and twenty-seven pioneers, of whom eight will be blacksmiths, eight carpenters, four masons and six boatmen. They will be provided with portable intrenching tools, which as a rule will be carried in carts. Additional intrenching and other tools, explosives and telegraph material will be carried in the store wagon of the detachment.

"In the latter half of June or during July of each year one officer or non-commissioned officer with two or three pioneers is to be attached to each regiment of cavalry as instructor.

"All officers and non-commissioned officers of cavalry must familiarize themselves theoretically and practically with the subject. Of the men as many as possible should be instructed.

"Each cavalry division carries in its ammunition wagons 112 dynamite cartridges, together with sledges, crowbars, wrenches, etc."

As to the best organization for our own service, opinions will differ. The idea of the writer would be, not to depend in any manner upon the battalion of engineers, (the real pioneers of our army), and not to assume any of their legitimate and indispensable functions. We must use high explosives, and it would seem that economy, if nothing else, would dictate (or authorize, if the permission were asked), the equipment and training of say, one subaltern, one non-commissioned officer and four privates in each squadron of our ten regiments. Twice the time spent in signal drill would keep a detachment in training.

The idea proposed would be this: At every post garrisoned by more than three troops, have a permanent detachment for each squadron, to be called "The Pioneer and Signal Detachment," consisting of one lieutenant, one sergeant and four privates, all except the commissioned officer to be replaced at intervals of four months. The detachment should be armed with revolver only, and should accompany the squadron on all marches and maneuvers, being excused from drill, guard and fatigue. A pack mule with special aparejo should be furnished each detachment for the purpose of carrying intrenching tools for the use of the squadron, as well as a supply of gun cotton or dynamite. The kit of each pioneer should contain a pocket relay with insulators for cutting in on a working line, a file, wire nippers, wire cutters, auger and handle, measuring

tape, hand ax, ten detonators, a spool of fine wire, a set of climbers, and sufficient half-inch rope to bring the total weight up to that of saber and carbine.

Drills should include telegraphy and the making of "faults" in lines, as well as the methods of "cutting in" without interrupting the current; cordage and spar bridge building; the handling and care of high explosives, and the methods of making demolitions, also packing. The actual amount of material to be carried, as well as the scope of drills and instruction, must result from experiment and growth, but as an initiative, a plan on which to build, a suggestion to be worked out, the foregoing is submitted for the thoughtful consideration and criticism of those most interested in the mounted arm.

REMINISCENCES.

By Brigadier-General R. W. JOHNSON, U. S Army.

FORTY years ago the definition of dragoon, as given by Webster, was, "a man who fights indifferently on horseback or on foot." This definition did not suit the bold dragoon, and an effort was made to have it changed in subsequent editions of the dictionary, and so we find in several of the late editions this definition: "Dragoon—A soldier who is taught and armed to serve either on horseback or foot, as occasion requires." But the name dragoon, so dear to those who served in the mounted service under that appellation, has been superceded by the more appropriate name of cavalry.

The cavalry arm of the service was not brought to a very high state of efficiency in the early years of the war. I refer more particularly to the volunteer cavalry. In 1861 there were in General Buell's army quite a number of regiments. One could hardly call them cavalry, but rather regiments of loyal, patriotic men, associated with an equal number of horses. Seeing this unorganized body, I spoke to General Buell about it, and suggested that I be assigned to the command of the mounted force of his army; that I thought it needed the attention of some one familiar with the drill and duties of cavalry. His reply I shall never forget: "The cavalry will not perform any conspicuous part in this war." This seemed to be the sentiment of all army commanders, so this state of things continued. Regiments were practically broken up, and the companies assigned to escort and courier duty. In this way little opportunity was offered regimental commanders to drill and discipline their commands.

It was not until 1864 that General Sheridan was placed in command of the cavalry of the Army of the Potomac. His experience as a cavalryman was limited by a short service with a Michigan regiment, but he soon developed the fact that he could fight on foot or horseback, as occasion required. When his assignment was an-

nounced, every one knew that PHIL SHERIDAN would not command a force of which no fighting was expected. He at once consolidated the companies into regiments, which he formed into brigades and divisions, placing these organizations under such enterprising leaders as AVERILL, CUSTER, WILSON, MERRITT, and others, and soon had a body of cavalry that was seen and felt in every engagement. I am inclined to doubt if there ever was a cavalry command superior to SHERIDAN'S, under the gallant leadership of such men as I have named.

In the West the wants of the cavalry were neglected. In many cases the men were poorly mounted, badly armed and equipped, and yet it is astonishing what good service it did under STONEMAN, STANLEY, MITCHELL, LONG, HATCH, ELLIOTT, KILPATRICK, MINTY, WILDER, and others. General J. H. WILSON was ordered West from the Army of the Potomac to assume command of all the cavalry under General SHERMAN. He was young, active and ambitious, and soon did for the Western cavalry what SHERIDAN had done for that of the Potomac. The battle of Nashville and the retreat of HOOD gave WILSON a fair opportunity to show what could be done by cavalry when properly handled, and every one remarked the great improvement in the fighting qualities of regiments when brought together. The war terminated so soon after this battle that little time was allowed WILSON to perfect the discipline of his command. Had the war continued several years longer the cavalry on both sides would have been brought to a much higher state of efficiency and acted a much more prominent part in every campaign.

A few days since I was asked the question, "Whom do you think was the greatest cavalry leader developed by the war?" I replied, that is a difficult question to answer, for the reason that all men have partialities, favors and affections, and are liable to be influenced thereby. If I could divest myself of all these, I would answer, FORREST. He began without experience, and with limited education. He had to organize and discipline the troops under him without a Subsistence or Quartermaster's Department. He marched and counter-marched, living on the country, and when he was in a destitute region he and his men subsisted on loyalty to the South. He was always successful in his battles and combats, and as soon as one was over, with rapid marches he was heard of on other fields. It is said that his success was so great that a number of army commanders summoned him to their presence to learn from him his mode of warfare. His reply was, "I always try to get the most men there *first*." Such strategy will win every time.

NAVICULAR DISEASE.

By Lieutenant A. M. Davis, Eighth Cavalry, U. S. Army.

OF all the diseases which horseflesh is heir to, there is perhaps none which is so little understood as navicular disease. There is also, I am led to believe, none which is more common. The rarity of an avowed case of navicular disease is, I believe, due to the fact that it is so generally misunderstood, and also to the hesitancy on the part of the veterinarian to pronounce it a trouble which he realizes he is unable to cure. He reserves the fatal diagnosis as a last resort.

During a tour of duty in this city (Fort Wayne, Ind.) it has been my good fortune to form the acquaintance of an eminent veterinarian, Dr. Henry A. Read, to whom I am indebted for the facts contained in this article. Early impressed with the prevailing ignorance of the causes of lameness in the horse, Dr. Read has, during a period of over thirty years, devoted himself largely to a determination of these causes, with the astonishing result that he finds nine-tenths of all horses lame in the fore legs are suffering from navicular disease.

Before proceeding to the pathology of the disease it will be interesting and instructive to glance for a moment at its history.

In Percivall's "Hippopathology," Volume IV, Part I, "Lameness of the Horse," he says, speaking of himself: "I never myself heard of the navicular disease or navicular joint disease so much even as mentioned before Mr. Turner published his papers on the subject.* My study of veterinary science as a pupil commenced and ended under Professor Coleman; and certainly never by my teacher, that I have the most distant recollection of, was the word "navicular," in connection with or reference to disease once mentioned. I remember that the Professor attributed foot lameness in general either to disease of the sensitive laminæ or to contraction of the hoof; and in my notes of his lectures I find this memorable

* The papers were sent to the professors of the London Veterinary College in 1816.—A.M.D.

passage: 'In nine cases out of ten of what are called groggy or foundered horses, these parts (the sensitive laminæ), in consequence of chronic inflammation, have become altered in structure, effusion of lymph or of bony matter taking place.'"

It is known that MOORCROFT recognized the existence of the disease under the term "coffin joint lameness," and practiced the operation of neurotomy in the early years of this century, but left England for India without imparting his knowledge to any one. At the time of the publication of the TURNER papers above referred to, the prevailing cause of lameness was supposed to be contraction of the hoof. This diagnosis, Mr. TURNER was led to believe, was incorrect, and to him must be given the credit of the re-discovery of navicular disease. After enumerating the causes which led him to search for some other theory than contraction of the hoof, TURNER says: "By dissection I have discovered another, and to the best of my knowledge, it is a disease which has never been described by any author. The seat of it is in the navicular joint of the foot; I mean the joint formed by the navicular bone and the flexor tendon, where the flexor tendon slides over the navicular bone."

PATHOLOGY OF NAVICULAR DISEASE.

PERCIVALL says: "The parts diseased, in cases of naviculartbritis (navicular disease) or grogginess, are the *under surface* of the navicular bone, and the upper one of the perforans tendon. It will be remembered that the inferior or posterior surface of the navicular bone is covered with cartilage for the purpose of articulating, *i. e.*, forming a bursa or joint with the opposing tendon of the perforans muscle, which, in the motions of the bone, upward and downward, plays over it something like a rope over a pulley, the surfaces of the bone and tendon being in more complete coaptation from the circumstance of the bone having a transverse eminence or crest across the middle, to which the tendon is fitted by a corresponding excavation in its substance, which hereabouts is rather of the nature of cartilage than tendon. * * * Now, it is either the said *crest across the navicular bone or the opposed concavity in the tendon, or both together, which show the earliest signs of disease in navicular-thritis.*"* Such was TURNER's acceptation of the pathology of the disease, and bringing before his class one day a horse affected with navicular disease, he explained to them minutely the morbid condition in which the surface of the navicular bone should be found, when, on destroying the horse, the surface of the bone was found to

* Italics mine.—[A. M. D.

be perfectly healthy. His disappointment was so great he ceased teaching the pathology of navicular disease, and died without learning how nearly he had arrived at the proper solution of the difficulty.

So far as I can learn, it remained for Dr. READ, above mentioned, to discover that the original seat of the disease was not in the surface of the bone at all, but in its center, or in the cancella. Had TURNER but sawed through the navicular bone which so disappointed him, he would have undoubtedly found the inflammation existing in the cancella. The true pathology of the disease then is as follows: Whatever be the immediate cause, the trouble starts with congestion of the cancellated structure at the interior of the bone. Inflammation and enlargement of the bone follow. In one specimen in my possession the color of the bone, interior and exterior, has been changed to a dingy brown by the congestion, while as yet the surface has not been abraded at all; in fact, the disease may run for months before it reaches the surface of the bone. When it does reach the surface the morbid appearances presented are ulceration or caries. At first little eminences the size of millet seeds are observed on the under surface of the bone. As it progresses, the bone looks worm-eaten, and later, holes will be found in the bone, into which, in some cases, the tendon will be found to have intruded.

It was this last phase of the disease with which TURNER was acquainted; or in other words, only its advanced stage. Further proof of the correctness of this pathology will be given in the discussion of treatment. The symptoms indicative of navicular disease depend upon the character and degree of the lameness and the condition of the foot. The approach of the disease is in some cases very slow, even stealthy; in others, very rapid. The horse may appear sound on being led from the stable, and on working awhile he will seem to favor one or the other of his fore feet. Examination fails to show any exterior cause of lameness, and a rest of a few days may cause him to appear sound again. On returning to work the same thing will appear again; this time probably more clearly defined lameness. A few days of rest again will appear to restore him. In this way, if the work is easy and not on hard ground, weeks and even months may pass before the horse is pronounced decidedly lame. The veterinarian will now be called in, the shoe removed, and the foot examined by means of the drawing-knife. It may now be found that the sole cuts dry and hard, and some contraction of the heels may also be observed. All hoof signs may,

however, be wanting until the disease has passed the first stages. Mr. TURNER recommends that both hoofs be pared out in order that any differences between them may be discovered, as it is but rare that both feet are attacked primarily at the same time.

The pain in a foot having navicular disease is probably more or less continuous, and it is but natural that the horse should advance the lame one slightly, thereby taking the weight from it and reducing the pain, "pointing the foot," as it is called. If he does stand in this way, the trouble is undoubtedly in the foot, and if so it is safe to pronounce it navicular disease. I have seen a horse that was suffering from this disease keep constantly changing the foot on the ground; first holding one foot up and then the other, and endeavoring by this means to ease the pain which he was suffering in both feet. He had had navicular disease for years, was constantly lame, and the owner did not know what the trouble was. To quote Dr. READ, "Heat of the foot, though one of the ordinary symptoms of navicular disease, will not be present in all stages of the lameness. When a horse, for example, falls suddenly lame, the cause of lameness not originating in inflammation, which as yet has not had time to set in, it cannot be expected that heat should be present. Neither will it be found in certain chronic stages of the disease, wherein lameness is rather the consequence of altered structure than of inflammation."

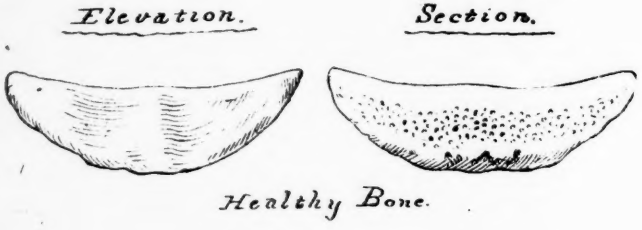
Careful inquiry should be made as to whether the present case is the first, second, or third attack of lameness in the same foot, and whether or not anything of the kind has ever appeared in the other foot. This is by far the most important of all symptoms. The very circumstances of relapse, from the tendency of navicular disease to return, adds the most important weight to the consideration of symptoms. PERCIVALL says: "Were a person a hundred miles off to write a letter saying, 'My horse goes lame and I can discover no cause or semblance of cause for the lameness; there is nothing to be observed to account for it. Once or twice he has through repose become sound again, though lameness has not failed to return every time he has returned to work,' I would, without apprehension of being mistaken, set it down as navicular disease. The treatment usually employed is to have the foot immersed in a warm bath, the immersion being succeeded by the envelopment of the foot in a hot poultice. By such treatment and a week's repose many have been restored."

I now come to the important part of this paper, namely, the low operation of neurotomy, practiced entirely by Dr. READ, and when

used in the first stages of the disease, with almost uniform success. To explain the *rationale* of the operation it is necessary to return again to the structure of the bone. As already explained the disease starts as a congestion and consequent inflammation and ulceration of the cancella or interior portion of the bone. This portion of the bone is rich in nerve fibre, and is the seat of the extremity of a branch of the metacarpal nerve. The pain produced uy ulceration amongst this nerve fibre is probably similar to that experienced by man from an ulcerated tooth. The horse mentioned just now as continually changing the position of his feet gave me the impression that he was in constant pain, his whole appearance indicating as much. The very ulceration which causes pain, however, is at the same time nature's cure for the trouble; it tends to destroy the structure of the cancella, and in its place solid bone material is deposited from the exterior of the bone. Should this process of nature work rapidly enough, no assistance from man would be needed. But before nature's cure has been completed, the ulceration has eaten through the surface of the bone and destroyed it. The result is that the tendon instead of having a smooth, lubricated surface to work over, has one that is rough and indented, causing intense pain to the tendon. As the evil progresses the tendon becomes imbedded in the holes of the bone, and the result is stiffness in the movement of the foot. Nature's remedy suggests one to man: destroy the source of supply of the nerve fibre of the cancella, the process of ossification will be hastened and ulceration stopped. This is done by the operation of neurotomy, in which that branch of the metacorpal nerve leading to the navicular bone is cut after it leaves the main nerve.

The discovery of the operation of neurotomy is in no wise claimed for Dr. READ; it was used in the early years of the century, as already stated. What is, however, claimed for him, is the discovery of the correct pathology of the disease; and the examination of upwards of one hundred navicular bones has convinced me of its truth. Its truth is moreover shown by the splendid results of his operations. In thirty years of practice he has operated on between five hundred and a thousand horses, in the great majority of cases with a return of soundness to the horse. Facts speak for themselves. The startling discovery to me in my work in connection with this subject is the alarmingly large number of horses which are suffering from this disease. In a lot of sixty navicular bones, brought in by the person having the contract for destroying the dead animals of this city, we found scarcely any that were sound. Almost all had the disease to

greater or less extent. It was this that led me to make the opening statement of this paper, that I believe navicular disease to be the most common cause of trouble in the horse. The cuts kindly made for me by Mr. F. HALVOYD LAMBERT, show clearly the stages of the disease as described.



Healthy Bone.

1st Stage of disease - inflammation

Surface ulceration, in case where nature cured the cancella by ossification.

Specimen from horse cured by Dr. Reed, - sound thereafter until death.

Advanced Stage.

CONVERSATIONS ON CAVALRY; BY PRINCE KRAFT ZU HOHENLOHE-INGELFINGEN.

TRANSLATED FROM THE GERMAN,
BY LIEUTENANT CARL REICHMANN, NINTH INFANTRY, U. S. ARMY.

ELEVENTH CONVERSATION, (MARCH 28, 1886)—OF THE TRAINING PROPER OF THE REMOUNTS.

H. What do you think is the best time for passing to the training proper of the remounts?

S. As soon as the remounts are gradually gaining strength, obey the preparatory aids, seek the bit confidently with head straight to to the front, and retain the feeling of the bit in all the natural paces, trot, walk and gallop. Then you may begin to work the hindhand more.

H. Since the remounts are transported by rail, the regiments of most corps get them as early as July or August. The training proper can then begin by the first of October.

S. If I were to name a specified date, I should be contradicting myself in the case of every single horse, and violate all the principles of rational riding. In the first place, the horses are not born on the same day. The remounts are therefore not of the same age, nor in the same stage of bodily development. Some horses develop more rapidly than others. Differences of build require some horses to be worked in natural gaits longer than others. It is therefore impossible to state on what date to pass with a remount squad to the training proper, the date for each horse being different; we can only say when each individual horse is ripe for training.

H. That each individual requires different treatment is plain to any intelligent rider. But I should like to have your opinion at about what season of the year the average remount arriving with the regiment in July is sufficiently progressed, barring, of course, exceptions in individual cases.

S. I must decidedly decline to name any particular season, not

even within the very widest limits. With each remount you begin the work of the hindhand, *i. e.*, the passing from the natural to the medium gait, the training proper, when the remount is ready for it. To recognize this time is the business of the judge, and, in our military training, of the instructor's eye and the rider's feeling, with which latter the instructor should come to an understanding by questioning him. Nor must you understand me as saying "To day the training of this or that remount begins," and that from this day on I put aside all natural gaits and preparatory aids. On the contrary, you believe the horse has sufficiently progressed. You attempt to bring the hindhand well under, to raise the forehand, the nose held low. If unsuccessful you have warning that you were mistaken, and have to return at once to natural gaits and preparatory aids. With our good-natured horses, however, you will probably succeed at once. The danger for rider and horse lies in this: that the former, rejoicing over his success, will soon demand too much in quality as well as in quantity, *i. e.*, he at once raises the forehand too high, and urges the hindhand too much; rides in the first days too long at a time at gaits approaching the medium ones, and causes pain to the horse. During the succeeding days the horse resists, having suffered pain in the stable, becomes restive and loses its appetite. It is time then to return at once to the natural paces, and to make moderate demands only, for some days. A good, experienced rider, who makes no mistakes, will teach a horse everything without worrying him. He never settles on a certain task for each day. The horse learns without noticing that it is doing anything unusual. Both horse and rider are unaware how it comes that all of a sudden the Gordian knot is undone.

H. My question as to the proper time for beginning, is prompted by the division into periods with which the second part of the riding instructions begins. There it is assumed that the first training of the remounts begins on October 1st, though, since they arrive so early, it might begin in July or August. I thought that you would proceed more slowly than the riding instructions, by beginning the training proper about October 1st.

S. It should not be forgotten that the average remount is a quarter of a year younger in July than in October, and less developed physically, and that less should be demanded of it. It is possible, of course, that sometimes a remount may have sufficiently progressed by October to allow of increasing and shortening of the gait. But this will certainly be the exception.

H. But you can not delay long in the fall if, according to the

division into periods, you are to teach the medium trot, fast trot, volts with turning, etc.

S. Nothing has contributed so much to the gross misunderstanding of the entire meaning of the second part of the riding instructions as this division into periods with which this part begins. It is merely an illustration, not a regulation.

H. How can a riding instructor infer from the riding instructions what is meant as regulation and what as illustration?

S. From the entire sense of the riding instructions in harmony with the correct rider feeling. In the first place please note that the division into periods covers a space of eighteen months, and that the text refers to the fact that the remounts arrive as early as July or August, and that this time should be utilized. The division into periods ends with March of the second year. What troop commander with any sense would place the old remount in ranks as thoroughly trained on the 1st of April?. What regimental commander would allow that? A careful leader, with a knowledge of his horses, will select with great care a few of the old remounts and put them in the ranks if entirely developed, taking for the large summer exercises most of the remounts for parade merely, and saving and leaving behind those which need it. As long as we have the inspections at the end of the riding course, the question is how to guard the young animals from the preparations for the inspection. The inspector can do much in contenting himself with what the horse's strength and state of training permits, in not requiring work by pattern nor expecting to see every horse fully trained ready for the ranks. Thus the real time of training lasts two years instead of eighteen months, and with some horses two years and a quarter, followed by six months, within which the training of the horse can be supplemented.

H. Will it be possible to save many of the old remounts in summer when the squadron is required to turn out for the large summer exercises with a certain number of files?

S. There are many opportunities for saving the old remounts during the maneuvers. The quartermaster, or some men not riding in ranks, are put on them. It is preferable, however, to drill in peace time with a few blank files rather than to ruin the remounts. I should prefer not to turn out, before fall, a single old remount for large fatiguing exercises in peace time.

H. Would you leave them in the garrison?

S. Certainly not. March and change of air will benefit them. It is only from severe exertions that I would guard them.

H. There you are clashing with SCHMIDT, who demands that every horse be turned out for the large divisional exercises, and says: "Those not in ranks fail to take part in the fight." He wants the number of riders and files considered in deciding whether an attack was successful or not.

S. General VON SCHMIDT was one of our greatest, perhaps the greatest, drillmaster of recent times. He did great things in preparing and carrying out the peace exercises of great masses. His demands on the rider in war are justified throughout. But I cannot accept him as authority on the individual training of man and horse in peace; he demands too much. As to the requirements of war, he is right. There it makes no difference if the horses fall by the bullet or from exhaustion, if only the object is gained; but when in peace time the highest demands are made on the horses before fully developed and obedient, they are ruined to no purpose. SCHMIDT, and still more those after him in the cavalry, who in part have failed to sustain his methods, and seek to outdo him, break down half of the remounts. The horse may not show it during the exercise, but will in the next few months or years. If you make these demands ten years in succession, you will have squadrons of which more than one-half of the horses are ruined, *i. e.*, unfit for war.

H. A squadron of full peace strength can turn out for the summer exercises with eleven files (among them two blank files); that is, eighty horses, not counting the old remounts, without which the squadron numbers 109 horses. Some of the old horses are going to go lame, or have to be spared for some other reason during the very fatiguing summer exercises; hence it would not be long before you will have to place some of the old remounts in ranks.

S. The more rationally and gently the remounts have been treated in the first two years, the better will they afterward withstand the fatigues of the maneuvers, the smaller will be the number of old horses that fall out from lameness or other causes, and the smaller the probability of having to use some of the remounts of the current year. The more the horses while yet remounts are fatigued, the surer the foundation for their ruin is laid, the sooner they will in after years break down, become lame, etc. It is better, therefore, to turn out for the maneuvers with a few blank files during a few years, than to ruin a single remount prematurely. It was war, however, that I had chiefly in mind. Would you rather take the field with a squadron with none but fresh legs under its horses than with one of which half the horses are of doubtful efficiency in the field?

H. Do you mean to leave the old remounts at home if war should break out during the time demanded for training by you, for instance in summer?

S. If up to that time I have spared them rationally, and turned them out in ranks occasionally only for exercise on days when the amount of work and the nature of the drill was not too much for them, I shall be able to use them in war to better purpose than if they have been turned out for all exercises, and have thus had the seed of ruin implanted in them.

H. I wish to revert once more to the division into periods. The riding instructions enjoin in every line a slow and gradual progression, and yet it seems to me as though by this division into periods so much is expected that no remount is able to accomplish it in the time allotted.

S. You may judge by this that a rigid adherence to this division into periods is not expected by the riding instructions. No intelligent rider will sacrifice a hair's breadth of the requirement—running like a red thread through the riding instructions—of a gradual progress in the training conforming to the physical development of the horse, for the mere purpose of fulfilling the letter of the division into periods. Adherence to the text of the riding instructions and their purport as a whole, which is in perfect accord with rational riding, should be the guide. Rigid adherence to the division into periods leads to the ruin of the horses. The procedure under the division into periods is, on the whole, correct, but should be modified so as to suit the case of each horse.

H. Still it seems to me there is much that is in opposition to your principles. If, for instance, in the first period, which, according to your principles, should for the most part be devoted to the mere preparation for the training proper as we discussed it the last time, passing of corners, changing corners across the hall, volts with turning, turning on the forehand, fast and medium trot, are to be practiced, these requirements seem to me opposed to your principles.

S. Not at all. Passing corners and changing should be practiced in the first period, if, as is assumed in the instructions, the "necessary evil" of hall riding is unavoidable. Where this evil can be avoided, I need not suffer its resulting evil effects. Volts with turning can soon be ridden, the only question being how. What else is the change of direction, under application of the inner leg for the purpose of familiarizing the horse with that application of the thigh which I recommend as preparatory aid, than part of a volt in turning? The same exercise at a halt which I discussed at the same

time, what is it but part of the turning on the forehand? If you were to begin with a volt of six paces diameter and an entire turn on the forehand, you would not have my approval, nor be acting in the sense of the riding instructions. With the fast and medium trot in the first period, it is the same. The riding instructions never contemplated thereby a perfect fast or medium trot, but merely an increasing and shortening of the gait, such as I require at the beginning of the training proper for working the hindhand. Only perfectly active horses are able to go a perfect fast and medium trot. Any good rider knows that, and it is to them that the riding instructions are addressed.

H. All this admits of no controversy. But the hapless riding instructor is inspected at the end of the first, or at any rate, of the second or third period, and he is expected to show, and the horse to do, what is prescribed for these periods in the riding instructions.

S. Where in the riding instructions do you find it stated that an inspection should take place at the end of each period? These riding inspections at the ends of the periods are a disease with which our entire cavalry is afflicted. The superior arrives and demands on the 1st of January this, on the 1st of May that. What does the riding instructor do? He lulls his remount squad to sleep and has to go mechanically through the task prescribed for that period. Volts, etc., and subsequently side paces are produced, but how? The best natured horses, whose conformation offers the least difficulties, are placed in the lead and rear, for whatever happens in the middle is not so conspicuous. During the last month before the inspection the work is confined to reeling off daily the requirements of the inspection. This consumes half the time of the training, instead of utilizing the entire time for making the horses effective for the field. Furthermore the instructor, who has exhibited his horses at the end of one period, is apt to consider them so far progressed, that he passes on to the next, and no longer concerns himself with the more primitive exercises of the former period, which, in his mind, is a thing of the past; yet it is in the sense of the riding instructions, again and again to go back to the most primitive exercises when meeting with difficulties, which were considered surmounted because an error was made and the horse advanced too rapidly. The instructor cares in the first place to come out well at the inspection. What becomes of the remounts after leaving his hands, concerns him little. The shirt is nearer to his skin than the coat. So you see what leads to precipitation in the training of the remounts, is the inspection at the end of the periods and not the di-

vision into periods which is intended merely as an illustration and guide.

H. I think the evil could be removed if the riding inspections were properly managed, and, as proposed in my letters on cavalry, would take place, not at the end of the periods, but a few weeks before that time, giving the inferior time to remedy the defects pointed out to him.

S. That would merely lessen the evil. It must be rooted out entirely. Every final riding inspection is apt to lead to the belief, that the horse or rider is "done." But in a certain sense horse and rider are never "done," for they can always learn more, while, in another sense, the squadron is expected to be "done" at all times. Of what use is a system of riding which can show its feats in April only, and forgets them again in the drill season? Of what use is a squadron which can have squadron drill only in May and June, target practice in July, regimental drill in August, and maneuvers in September? May not war break out at any season? Should not the squadron be able to drill at any time during the year? Why then the periodical inspections?

H. Without control, no achievement. As the inspection, so the work.

S. Very true. I take you at your word. As the inspection, so the work. For this very reason inspections should not take place at the end of certain periods fixed for each year, otherwise the exercises are so conducted that some riding can be exhibited at the final inspections. The inspections should be so made that the inferior will never know beforehand of the superior's coming. If the latter wants to inspect the riding of the remounts, he must not allow himself to be treated to a performance as a ballet, or a circus quadrille, but should be present during the instruction (whether during the first, second, fourth, eighth or ninth period of the riding instruction, is immaterial), and must insist with iron rigor, that no more be required of any remount than it is capable of, in view of its physical development and previous rational training. Thus the superior can exert an intelligent influence, and judge the inferior by his way of imparting instruction. That once done, you should see how the coaching for inspection will come to an end.

H. But you must fix on some date by which the remount must be ready to be placed in ranks.

S. No! No! The horse is placed in ranks when it has gained full strength and is broken to obedience. Or do you want me to say for instance, on this or that day the horse must be placed in ranks; by

that day it must have gained full strength and be rendered obedient? From the words "full strength," you will perceive that I would be saying something wrong. Many riders forget that a horse's obedience and full strength stand in close reciprocal relation; that full strength is promoted by long, rational training; that precipitate training is apt to be harmful; that only such horses can be rendered thoroughly obedient as possess their full strength, because before the development is completed they have weak points which, if disregarded, bring on obstinacy. The red thread running throughout the remount training, should be that the training of each individual horse be as slowly proceeded with as indicated by its previous exercises, conformation and development, and that it be not placed in the ranks for all kinds of service until it is fully developed and obedient.

H. Then you will not be able, as a rule, to place the old remounts in the ranks until after the great fall exercises, and you will have a remount here and there which needs additional training during the following winter with the next younger class of remounts.

S. What harm is in that? As old horses they will remain serviceable all the longer, will be trained all the better; so much the better riders will be trained on them, because then the recruit will imbibe an all the better rider feeling with the mother milk, so to speak.

H. It is not difficult to see that the training will be much more perfect, if no time is fixed by which the horses must be rendered active, than when you are tied down to a certain time. Hereafter I will ask my question on the further training with as little reference as possible to the calendar. I should like to know next whether, when you begin to work the hindhand, you would also begin to bend the horse?

S. Nothing bends the horse better than the bringing up of the hindhand in the active medium trot. It prepares the bending throughout the horse's structure. Bending sideward should, however, not begin too soon. Many riders fall in this error. It "kniebels" the horse and deprives it of the confidence in the reins which has been imparted by a rational working of the hindhand. It will creep away from the reins.

H. You have already given warning that in beginning it there should be no attempt to bring the young horse forward on the hindhand at a walk. The chief working pace for this purpose is the trot.

S. And the gallop. I need not explain to you how in both these gaits the hindhand is brought under.

H. No! The course of training as outlined by you agrees too much with what my instructor LANGENN also prescribed, to need much explanation. He increased the natural gait by driving forward with the thigh and relaxing the reins gradually at the same time. When the horse then began to seek the reins, he made us endeavor to reduce the gait gently with the reins, gradually relaxing the thigh pressure at the same time. As soon as the horse decreased its gait, it was again driven forward with the thighs, and the reins were relaxed. The aids thus given alternately by thigh and rein gradually approached each other. It required many days, weeks, even months, before thigh and rein could be applied simultaneously. This work on a straight course requires much patience, and frequently throws the rider into profuse perspiration. But when thigh and rein can once be applied simultaneously, the horse is placed "between thigh and bit," and the natural trot has been transformed into the medium trot before you know it.

S. I place much value on the gallop as a means of working the hindhand. The gallop is a gait very sympathetic and natural to the horse. But those alone can properly work at the gallop who sit correctly, conform well to the motion, and do not need the reins for keeping their seat. For this reason I speak again and again of the seat. Many riders and instructors inwardly hate the gallop, especially the extended gallop, because they do not know how to ride it; because they lack the disengaged seat; because they do not let themselves go and allow the horse to move freely; because they come in conflict with the horse in this manner. They seek to make up by force for lack of adroitness in the saddle, interfere with the gallop jumps of the horse and cause pain, to which the horse responds by stiffening itself, staring and pulling on the reins. Such choking and fighting ruins the horse's body and character, and the riders think that it was the gallop that spoiled the horse, when, in fact, it was the manner in which they rode it. Cavalry must be able to gallop for maneuvering, charging, patroling, and producing bold riders. Whoever cannot make a long gallop with an easy rein, is not a properly trained cavalryman, and can be given no voice on campaign riding. The long gallop is the rider's touchstone; the proof of the example cheers the heart, brings self-confidence, the feeling of invincibility, without which cavalry can do nothing. In riding the young horse at a gallop, its jump should be absolutely unimpeded. By increasing or shortening, a medium gait is reached,

in which the work is the same as in the trot, consisting merely in increasing and decreasing the gait. The "short gallop," *i. e.*, the shortened gait at the gallop, should at first be as carefully avoided as the shortened gait in the trot. Both are school paces, and pertain to an entirely different period of the training.

H. Now I need not ask the next question I have had on my tongue, *i. e.*, when you would begin to bend the horse sideward, for from what you have said, it appears that the time for it has not come until the hindhand is so far brought under, and the remount takes the reins so that the natural trot and gallop have gradually been transformed into a medium gait, which admits of being increased or decreased.

S. Yes, and the walk will then have become steady without it being necessary to torment the horse by bringing the hindhand under at a walk. The work on the straight course will also have bent the haunches to a certain extent, for the bringing up of the hindhand causes the same to be placed well under, and the weight to be shifted to the hindhand.

H. With what exercise do you begin the sideward bending?

S. Before speaking of that I should like to refer to some principles in bitting and handling of the reins, which I see frequently violated, for irrespective of the impracticability of rational riding without correct bitting, handling of reins and bitting are prime factors, especially with remounts at the beginning of their training.

H. The riding instructions and the works of KRANE and SEIDLER are the most correct on this point, I should say.

S. The only correct ones. Yet they are frequently sinned against, because in riding young horses the rider is not sufficiently careful of himself to see that the middle between the two reins and when riding on one hand, the bridle hand be exactly over the middle of the horse. This causes misunderstanding, precludes a proper "standing to the bit," control over the hindhand is lost, and one rein only, the wrong one, remains in operation. The rider should constantly feel both reins lightly, otherwise the proper action on the neck, obedience, is lost; head and neck are misplaced. Frequently horses go on one rein only, mostly the left one, as the result of faulty snaffle work, chiefly because the rider in using the curb habitually lets the bridle hand hang down on the left. This brings about a wrong bending of the neck to the left. You may observe this with most men of the squadron. It should be carefully looked out for, nor should the instructor allow his pupils to acquire this habit. It does not make so much difference in riding for pleasure,

when the rider may use both hands as in horse breaking, and in drilling, when the soldier holds the weapon in his right hand. If the reins are removed from over the horse's middle the animal becomes confused, cannot be properly turned, etc. Again, the proper position of the reins is impossible without a correct seat. It brings about refractoriness, and if you are strict with yourself you admit that it is you who is wrong. Frequently the cause of the horse's leaning on the reins is that bendings and lessons are demanded for which the horse is not yet ripe. In addition, horses that take one rein only are more quickly used up, their legs suffer from one-sided use, not to mention a galled back from great exertions in the field, refusal of food, exhaustion, etc.

H. Much harm is done also by using an unduly long rein.

S. Chiefly because the rider is apt to take the reins too short, believing to have thus better control over the horse. That is an error. The horse familiarizes itself more readily with reins of proper length, and seeks them, while it endeavors to get away from the short rein which hurts; for the rein, if too short: 1. Deprives the horse of the possibility of stepping out, of extending itself, of selecting the spot where to plant its feet. It deprives the horse from beginning of the initiative, renders it systematically unsteady, which will manifest itself later in riding on uneven ground. 2. With high paces, mouth and balance are lost. 3. The position, the rider's seat, are lost. He advances the hand, draws in his left side, and leans to the right. Result: Saddle galls on the left front and right rear. 4. It invites falling. When stumbling the horse seeks to save itself from falling by planting the fore legs and stretching the neck. Too short reins prevent the horse from doing so. The rider is at the same time pulled forward, and cannot, as he should, throw back the upper part of his body, and take his weight off the fore part of the horse. 5. The horses are thus prevented from looking out for themselves, become unsteady, stupid, and the riders become diffident and cowardly, for they lose the confidence in themselves and the horses.

H. The reins should, however, not be left loose too long at a time.

S. Of course not so long that the rider loses all action upon the horse. The fault of too short reins is the more frequent one.

H. It is a pity that there can be no fixed rule for the length of the reins.

S. The length of the reins depends on the length of the horse, the position of its head and neck. Nothing better could be said on this point than what is contained in the riding instructions.

H. There are many riders who seek to remedy the defects in the construction of the horse's neck by auxiliary reins.

S. Unfortunately, yes; it is carried so far, that the anglomanics, particularly the awkward ones, cannot take a ride without a martingale. That expedient is useful only in breaking horses to the gallop for racing purposes, and under an excellent rider. For riding hall work it is injurious, produces an oblique position of the head, a faulty bend of the neck, and accustoms the horse to pull with the head upward. For campaign riding the martingale should be discarded, for reasons: 1. If short in order to be effective, it impedes the free movement of the horse, especially in the high jump, and drags the stumbling horse down on the ground, and is therefore dangerous. 2. It takes away the lateral action of the reins. 3. It causes the horses to be bridled too high, and injures the forehand. 4. Its correct use requires the use of both hands, while the soldier has but one hand available. 5. Bridling in case of alarm is delayed by the martingale, and the leading of a spare horse by the snaffle made impossible.

H. The use of the martingale was once recommended to me for a horse that had an inclination to the ewe neck when I bought it. It braced itself against the action of the martingale, and developed the ewe neck all the more.

S. I could have told you that at once. And yet the martingale has become the fashion.

H. In the division which I commanded there were infantry regiments among whose chargers more martingales could be seen than "jump reins" in a whole cavalry brigade of 1,400 horses.

S. I do not like the fixed "jump reins." They are frequently used against tossing of the head, and for confirming the position of the neck. They are injurious to the development of the paces, and of evil for man and horse. They fail of their purpose entirely. The position of the neck can be modeled over only by driving the hindhand forward against a soft, but steady hand, never by strapping up the horse forcibly. The tossing of the head is usually the result of factory-like, senseless work. When the rider begins to drive up the hindhand, to bring the horse's head and body closer to the head, it is unavoidable that the constraint should cause discomfort and pain in the compressed muscles, particularly if the nether jaw is sharp, as in blooded horses which resent any constraint. If too much be demanded at once, if some relaxation is not allowed so that the poor animal may stretch and refresh the pinched muscles, it becomes exasperated and seeks relief in tossing its head. It is the

rider's fault, and if he apply force in the way of auxiliary reins, he adds to the obstreperousness of the horse.

H. In my limited practice I had an experience which proves the correctness of what you say. I rode a horse with a short carp back, and long, slender neck. It would vault its whole neck and spinal column like a fish, and when I happened to sit carelessly, I was apt to receive a blow from the horse's head in my face that made my nose bleed. I asked the instructor's permission to use a "jump rein." He declined and demanded patience, seat and a light hand. After much work and untold patience, the animal gained confidence. I rode it many years and in two campaigns, and never had a nimbler, more comfortable or agreeable horse without "jump reins." For this reason I have always been opposed to the "jump rein." In the hussar regiment of my division there was but one. All officers, however, who knew that horse, even the greatest opponents of this instrument, including Colonel KAEHLER of the regiment, declared the "jump rein" indispensable in this case. The horse would throw the head back obliquely and, in the absence of the "jump rein," run madly away. Many a rider had been injured by it. When it felt a "jump rein," that made this maneuver impossible, and its behavior was exemplary.

S. You see how smart horses are! Had you been able, however, to follow the training of that horse from the beginning, you would have observed that the animal acquired the bad habit artificially in one way or another, and that correct treatment would have precluded the habit. For this reason I object to any kind of auxiliary reins in the training of remounts.

H. Have we the right to reject those auxiliary reins, which are enumerated in that part of our gospel, our riding instructions, which treats of the training of the remount? There we read: "Bearing-rein, cavesson, dumb jockey."

S. All works on riding, and foremost among them our riding instructions, are agreed that auxiliary reins require particularly good riders, and are dangerous instruments, which, in most cases, do more harm than good, and are not to be used by riders whose skill is doubtful and understanding defective. That is the case with all remount riders of our squadrons. However thorough the instructor's knowledge, and however great his experience, he cannot supervise every pull of the rein of his dozen of pupils or prevent faulty ones. Auxiliary reins whose action is lever-like and twice as strong as that of the simple snaffle, double the faults. Imperfect riders mean to force the horse with the help of auxiliary reins. They believe them-

selves at first to be successful, but the horse deceives them, and they themselves. The giving way sideward of the upper part of the jaw and the croup and dropping of the neck, they mistake for a proper yielding, and fail to notice that the horse is creeping behind the bit. Confirmed in this idea, they mean to reduce the poor animal to obedience by forcible means. They mean to attain forcibly, without effort, and at once, what can be the result only of gradual and progressive exercise in bending and rendering the horse supple with the help of aids and lessons intelligently applied. Impatience, lack of skill and understanding, and personal comfort, make auxiliary reins an instrument of torture. There are good-natured horses which stand this cruelty, and finally go in one way or another. Impure paces and excessive work are the result, and the poor rider does not know that he is condemning himself in saying, "The horse goes pass paces," or "runs away," or "is already broken down." Many young horses are prematurely condemned, and old, used up, dull horses have to be retained one or more years after they have ceased to be serviceable. The best auxiliary rein is the steadily driving thigh.

H. Would you also prohibit the use of the auxiliary rein in the squadron for retraining of horses?

S. There are probably one or two riders in each squadron who have made sufficient progress in riding to apply auxiliary reins intelligently. The less, however, auxiliary reins are used in the first training, and the more rationally that training is carried on, the fewer will be the horses which require retraining with the help of auxiliary reins. In the squad they should never be permitted. All works on riding assume that in the training, and particularly in the use of auxiliary reins, the rider rides by himself, and can devote himself exclusively to his horse. That is impracticable if he is to pay attention to distances, other horses and commands.

H. The same may be said of too sharp a curb.

S. There are excellent riders who can ride with the sharpest bit, because they are skillful enough to ride lightly and gently in spite of the curb. In school riding, *i. e.*, the old high school, the curb is used, and applied, like all auxiliary reins, with understanding and care. Exceptionally good riders can ride with the sharp curb in the open and before the front, not however, in ranks. For purposes of campaign riding we can not caution too much against sharp bridling, *i. e.*, too long a pull, too tight a curb strap. It is unnecessary to state that the snaffle incorrectly placed, either too high or too low, ill fitting, too wide or narrow, torments the horse.

As with all auxiliary reins, so I am equally opposed to all extraordinary kinds of bits and bitting, with which so many riders torment their horses.

H. The riding instructions mention among the auxiliary reins, the "training halter." Do you reject that also? LANGENN had every remount bridled, in the beginning, with a kind of riding halter, *i. e.*, with the snaffle with nose strap.

S. He was right. If you call the nose strap an auxiliary rein, which you must since it forms no longer part of the regulation equipment, I am in favor of this one auxiliary rein. I did not think of this before, for, during the greater part of my service, the nose strap was part of the equipment. It is exceedingly difficult to break a horse without nose strap, and requires particularly fine touch. If the horse is able to open its mouth wide, it will displace the upper part of the jaw, gather the tongue against the bit, or place it over the bit, let it hang out on the side and use a number of smart tricks to escape from the effect of the bit and bending of the neck, and brace its body. The rider, easily deceived, mistakes the "standing behind the bit" in the hall for light touch. In the open he begins to realize that the horse is not bent, and has deceived him by creeping behind the bit. It is difficult to break such bad habits. The nose strap prevents them. Some riders have such a hard hand and faulty application of the thigh, that horses will nevertheless acquire these bad habits. A light hand, in combination with the nose strap, prevents them.

H. The nose strap no longer forms part of the regulation field equipment.

S. Unfortunately not. If a horse is perfectly broken, *i. e.*, supple and obedient, it may confidently be ridden without nose strap for an ordinary ride, the chase, etc. In the service it is an evil. This is proven by the extraordinary increase of horses who stick out the tongue. Fifteen years ago they were infrequent, now they are numerous. For this reason I regret that it has been discarded, and hope it will again be adopted.

H. You were quite right in discussing the handling of the reins before the bending, as from faulty management of the reins and incorrect application of auxiliary reins a faulty bending must result. Permit me, therefore, to revert to the question how you begin the side bending lessons.

S. The sideward bending of the horse is begun by every rider, by most of them without knowing it, with that turning in which the hindhand steps in the trail of the forehand. It is that turning

(passing of a corner) in which the application of the inner thigh and letting go of the hindhand is no longer used to teach obedience to thigh, but in which the hindhand is checked by the outer thigh. Few riders know how in such passing of a corner a horse must bend as on a large circle, and what demands are made on the horse by beginning too early with the passing of corners.

H. Then you give the first bending lesson on the circle in the hall?

S. The large circle in the hall is too small for the beginning. Begin on a large open space, with half and quarter circles of greater diameter; but, mind you, not before the horse obeys thigh and rein on a straight course at a medium gait, makes but one trail, and can increase or decrease the gait according to the rider's will.

H. That would be about the time when riding in squads on the square with distances may be begun.

S. About, yes; but not before the horse can bend without pain on a circle so small as the large circle of half the hall. In the square the riding should at first be so regulated that along the short side a half circle is described instead of passing two corners. Under no circumstances should riding on the square with distances be begun too early or continued too long. Individual riding always remains the chief consideration. It follows from what I have stated, that not all horses should be brought into the squre at the same time for riding with distances, but one after the other when sufficiently progressed. Riding with distances is of great value. It is, as previously stated, the test whether the rider has worked forward or backward. For the service it is a matter of necessity to equalize the pace; otherwise closed evolutions would be impracticable. When horses once go a medium pace, and can increase or decrease the gait, observance of distances no longer entails danger to the gait as at the beginning, when the horse must be allowed to go its natural gait.

H. I told you before that LANGENN enjoined not to regulate the distance by increasing or decreasing the gait, but invariably by rounding off the corners or following them more closely. Increase and decrease of gait he demanded, according to the horse's progress, at every stage of training, until it could be done at every step, and perfect obedience to thigh and rein obtained. For regulating distances, however, he prohibited any change of gait, driving forward, or holding back.

S. He is right as to detail. On the whole, however, all riders must pass over the same distance in the same time, and thus a uniform medium gait is obtained, such as prescribed in the regulations.

H. Further bending is obtained by riding closely into the corners.

S. Yes, but very gradually, and at first with a considerable rounding off. Then you may advance to the circle and bend the neck in motion.

H. Not at a halt?

S. In the beginning I prefer the bending while in motion, because in bending the horse at walk, it is apt to get behind the bit. I begin with a lively medium trot. When it is once certain that the horse will not creep behind the bit, you may bend its neck at a walk, and finally at a halt.

H. I heard some riders say that they began with bending the forehand; others, that they began with the hindhand. I never could understand that.

S. Nor can it be understood, for the former is injurious; the latter, impossible.

H. But you stated the last time, that in beginning the turnings, the hindhand may be allowed to fall away. In doing this, in the vaults with turning, the forehand is bent alone without the hindhand.

S. You forget that it was during the preparatory stage only, in order to impart to the horse a lesson, to teach it the rider's language, to render it obedient to the thigh. If, after the hindhand has been brought under, and bending of neck and haunch in the vertical plane has been attained, sideward bending is begun for purposes of training, a gross error is committed in bending the forehand without the hindhand. Bending of the forehand without the hindhand is impossible, since we ride with thighs and reins. Whoever says that he bends the hindhand first has recognized the disadvantages of the bending of the forehand alone, begins as recommended by me by bringing under the hindhand, and believes he is bending the latter only. Without knowing he is bending the forehand at the same time, if he has a good, steady hand. The horse is a very singular being, upon which any kind of action produces effects. You cannot act upon any part without affecting other parts at the same time. Hence it should be endeavored to act correctly upon all parts of the horse's body at the same time.

H. You would seem to be decidedly opposed to bending the horse led by hand.

S. Bending by hand must be used cautiously and discreetly. The horse is apt to be brought behind the bit, as in BAUCHER'S works all the horses are drawn with the bend in the region of the third vertebra. To make himself intelligible to, and familiar with

the horse, a good rider may risk the bending by hand; not too much, however, or too long, nor so that the hindhand escapes the effect of the bridle.

H. Do you accomplish the further bending by means of the volts?

S. The volt of six paces diameter is about the sharpest bending that a horse may be subjected to, for we ride even the riding paces with the bend of the body given by the volt (a sharper following of the corners in itself is a sharper bend, but only a quarter of a circle). A good volt is the touch-stone of complete training. Generally the volts are begun too early; more particularly volts with distances and command should not be ridden until the horses are thoroughly worked through. At any rate, the increasing and decreasing of the circle should be much practiced before attempting volts.

H. I knew many riders who were decidedly opposed to any circle work, and were of the opinion that the only result was that the horses got lame.

S. That is bound to be the case when it is overdone, and likewise if any bending is overdone. Most riders fail to consider what pain the poor animal is suffering in its muscles from the unwonted bending, and how necessary it is to allow the horse frequently, very frequently, to stretch itself. How our own muscles do ache when kept for some time in an uncomfortable position! How we do stretch ourselves! And to the horse we are unwilling to concede this, and lay to ill nature and unwillingness when it does what it is prompted to do by severe pain. No wonder if it does become unwilling. Hence quite short lessons; frequent opportunity for the horse to stretch itself; frequent change by bending to the other side, and, to prevent the hindhand from remaining behind, frequent change to the medium trot with which any exercise should wind up, the object of which is bending. Frequently we see such an exercise continued too long; for instance, an instructor will sometimes keep a squad on the circle on the same hand for a quarter of an hour. Nothing could be more injurious to the character and nature of the horse than the senseless riding of exercises for their own sake. With every lesson the rider should have an object in view, and when he has attained it in some slight measure, reward the horse by leaving it untormented, and practicing something else. A lesson by itself without object is senseless and harmful.

H. We frequently find even good riders too deeply enlisted in circle work for bending the horse on one hand.

S. When they do so, because they continue the exercise too

long on one side, they show that they do not understand their business and are not good riders. It happens, however, that an otherwise good rider becomes angry, practically when he begins to feel tired. Well, an angry man hardly ever does anything wise.

H. My often mentioned instructor had a good remedy for the quick anger of riders. He always carried a knife in his pocket, and whenever a rider became very angry with his horse, he would offer him the knife to kill the horse on the spot; he said that would be better than to torment it that way. This offer had invariably a calming effect.

S. I cannot refrain from inviting your attention to an error committed by most riders in bending, and revert again to the seat. They allow their seat to be deranged by the work of the hands. They then sit the horse obliquely and thus give with their weight and thigh unintentional, and therefore, faulty aids. In doing so the inner hand passes over the horse's back to the outer side, while the outer hand passes to the inner side. The crossing of the hands confuses the horse, and should not be tolerated. Yet you can see that frequently.

H. It would perhaps be well to endeavor to progress before winter sets in sufficiently far in the training of the remount to allow of riding on the square with distances.

S. Why? Errors of precipitation are always committed when a certain term is set for certain progress.

H. When the wintry season prevents work in the open because the riding places are frozen over hard, and the hall is at the disposal of the remounts for three-quarters of an hour or an hour each day, all remounts must be brought to the hall together.

S. Most of them will be sufficiently advanced. If, however, one or the other is not, it should preferably be worked by itself.

H. But the hall is occupied all day.

S. It will not be occupied all day, if the old horses are so ridden and treated as I want it. The hall is there chiefly for the sake of the remounts and recruits. They have preference. Everything else comes after them. Any kind of hall work is fruitful of result only if the horse is ridden by itself without regard to distances and commands. This alone should show you why the old school halls were built so small. They were built with regard for individual horses. Hence all such work is to be done in individual riding, so also in the hall. The instructor should dismount the squad, and let it rest or move about in the hall, and should take the riders one by one, of whom perhaps two or three at the most work by themselves

at the same time, but without reference to each other. In the beginning the whole squad, observing distances, should ride medium gaits only, and practice increasing and decreasing same, not, however, without considerably rounding off the corners.

H. Would you not put the whole squad on the circle, increase and decrease the circle, and bend in the medium trot?

S. Not until individual work has shown that the horse has made sufficient progress. Individual riding must remain the main reliance in the hall, too. In this manner an overworking of the young animals by training is avoided; the riding instructions mean to prevent overwork by prescribing a maximum of one hour use of the hall, for if you prescribe much individual riding, a part is resting, and each horse is subjected to training and fatigue during one-half only of the prescribed time; during the other half it is resting.

H. Would you let young remounts gallop in the hall?

S. Why not, if they are sufficiently advanced that it does them no harm? The duration of the gallop should, however, be shorter than in the open, because in the small hall the turnings come oftener than in the large riding place, and fatigue the horses. At any rate, it should not be considered a crime on the part of the horse when it falls into a gallop of its own accord, nor should it be held back, but it should, as I have explained for the natural gallop, be driven with the thighs, to prevent the hindhand from remaining behind.

H. What is the next bending lesson you would take up after enlarging and diminishing the circle and bending on the circle?

S. It is the riding of the medium gaits in the second position. Few riders are aware how strongly the horse must bend to go in the second position. They should be compelled once to walk even five minutes with their faces turned as far to the right as the horse must turn its face, so that the rider may see the nose and eye, and they would soon feel pain in their muscles. The position toward the same side should therefore not be continued too long, as all exercises should be continued but for a short time in the beginning. It is important to use at first lively medium gaits only. It is in these alone that the hindhand (and more particularly the inner hind foot) is so much brought under, that it begins to carry the forehand, while in a shuffling, sleepy gait the hindhand remains behind.

H. A very effective lesson is the riding in counter-position, especially on the circle.

S. A very effective lesson indeed, which is to be recommended. But because it is so effective it should be used with discretion, for its effect on the horse is in proportion. I recommend, therefore, to

make in the beginning but few successive steps in that position, and to pass not more than one corner, strongly rounded off, in the counter position, if you wish to avoid injury to the horse's hind legs. This lesson is the principal means by which trainers working for the horse traders quickly reduce horses to some kind of obedience, in order that they may be sold at an early date, not caring, of course, what becomes of the horse afterward, a method of training called "the Jew's spit." Yet this lesson is not to be rejected with horses which, while in the proper position, show inclination to give way with the croup to the outer side and to refuse the hindhand.

H. Closely connected with the second position is the "breaking off." LANGENN never liked the term, and called it instead, "giving way with the hand."

S. The term, it is true, is not well chosen, because it is apt to make one believe that the application of force is implied. This exercise should likewise not be overdone. The rider should give as soon as the horse gives, and use his thighs so that the horse may not creep behind the bit. It should therefore be begun while in motion at a medium trot, nor should it be omitted in the gallop as soon as a medium gallop is admissible, and it is only subsequently that this lesson should be taken in hand at a walk. Nor should it be done at a halt before the horse is well up to and confidently champs the bit, the hindhand well under. Like bending, the "breaking off" dismounted by hand, should be done with great caution.

H. What has struck me most regarding the division into training periods contained in the riding instructions, is, that they require that the young remounts be practiced in the "schulterherein," "travers" and "renvers" as early as March and April.

S. It is stated on page 44, that during the first year the precision required in the second year is not to be demanded at first in any of the lessons. That does not mean that they may be ridden awkwardly, in impure gaits, the hindhand falling away instead of being brought under, but that in the lessons on the double trail, the two hoof tracks must not be farther apart than in the finished side pace.

H. Your demand coincides with the principles established by LANGENN. He demanded that in the beginning the one-sixteenth "Schulterherein" should be ridden.

S. In nothing is there greater error committed than in the lessons on the double trail. They are practiced for their own sake, to show them off at the inspection, not as a gymnastic exercise, as a means to an end. When the end has been attained, the means is no

longer needed. Hence lessons on the double trail should never be "inspected," least of all in squads with distances. The efficiency of the horse trained as a military mount should be looked for as the result, and the means thereto should not be used for quadrille exhibitions.

H. I had a horse once that had never been put through the lessons on the double trail, and yet was perfectly active and fit for everything that could be demanded from a military mount. When old it went willingly under a young rider, even the paces on the double trail, which it had never been taught. I rode the horse more than seventeen years.

S. Not every horse needs the gaits on the double trail to become an efficient military mount. There are horses formed by nature so normally, and presenting so little difficulty, that they do not need these exercises. They can do them more readily, and are therefore frequently used to show the art of riding in its highest perfection. There are other horses of such difficult build, that they can never be given lessons on the double trail without injury. In such cases it is better to omit these lessons altogether, than to ride them incorrectly. Frequently, almost invariably, these lessons are begun too early and the horse's gait is spoiled. Whenever you see remounts whose hindhand is not brought up, which pace at a walk, which, at the trot, do not step with the hind hoof as far as the imprints of the fore hoof, nine times out of ten they have been spoiled by premature lessons on the double trail, ridden faultily at that, in which the hindhand falls away instead of being brought under and carrying the forehand.

H. It is better, of course, not to give any lessons on the double trail than to give faulty ones.

S. Worst of all it is with the "schulterherein." Horses may well be broken without this lesson. That was possible before the times of its inventors, La Guérinières and the Duke of Newcastle. At the time, the invention was looked upon as the expression of the highest perfection in the high school, not as a means of instruction. These old masters of the art of riding would turn over in their graves if they should see what is now perpetrated as the "Schulterherein."

H. Yet it is prescribed in the riding instructions.

S. Whoever reads that part attentively feels what difficulties the author encountered to make himself even approximately understood. It is supplemented by an addendum explaining the many errors committed in the "schulterherein" and attributed to insufficient

work and too high demands, *i. e.*, invariably to precipitation in training. It is therefore in the sense of the riding instructions not to demand too much, and to work the horses sufficiently in elementary exercises before passing to lessons on the double trail. They should be deferred until the horse is sufficiently prepared, and if it never reaches that stage, they had better be omitted altogether.

H. Could you make a horse active for campaign riding without these lessons?

S. Not only can I do so, but I am compelled to, since, as stated above, there are horses which can never go those paces without injury. The "schulterherein" can be dispensed with altogether. The "travers" and "renvers" might be replaced, in case of difficult conformation, using position and counter position with increased application of the outer thigh, by a gait resembling the one-sixteenth travers and renvers mentioned by you, and which causes the hind-hand to be brought well under the load, which is the sole object of all these exercises. You find the same idea explained in detail in the excellent book of PLINZNER.

H. Then you would prefer to do away with the "schulterherein?"

S. I should like to see it absolutely forbidden to teach these lessons to whole squads, and to have them ridden with distances, just as in the introduction of the riding instructions it is forbidden to teach the lessons intended for the third riding class to whole squads. On the other hand, the men of the preferred class, who have to do the breaking, should learn the lessons on the double trail one after the other, as their knowledge increases, provided they fulfill the preliminary requisites, *i. e.*, light hand, rider feeling, correct aids. We must insist that the non-execution of difficult lessons does no harm; that badly ridden lessons are bound to do harm.

H. You spoke above of bending and "breaking off" in the medium trot. You certainly could not practice side paces in the medium trot.

S. Certainly not. A perfect side pace can only be ridden in the shortened trot with high action.

H. But according to your statements the shortened trot belongs to the high school.

S. Yes, when perfect; just like the shortened gallop and the side paces on the double trail, if they are to be ridden faultlessly.

H. Then you want the horses taught the shortened trot on a straight course by continued work in increasing and decreasing the gait, before passing on to the side paces.

S. That would be irrational. We never complete one thing en-

tirely before beginning the next. All kind of work with the object of bending the horse must progress simultaneously. The trot "with shortened gait" must be developed simultaneously with the side pace, very gradually, however, and never more rapidly than in proportion to the horse's capability and bodily development.

H. I think I understand you now. When the horse has learned how to go the medium trot with position, and has made some progress in "breaking off," and increasing and decreasing the gait, then you shorten the gait somewhat and give more position to the forehand or to the hindhand, or to the hindhand with counter position, giving thus an idea of "schulterherein," "travers" or "renvers," and at the same time increasing and decreasing the shortened medium trot.

S. I ride the side pace on the single trail, so to speak — the one-sixteenth side pace, as LANGENN calls it. As bending, capability and development of the horse progresses, I take more position, so that finally the trail of the forehand separates from that of the hindhand, and, hand in hand with this, I strive for increased shortening of the trot.

H. I believe there is danger of being deceived by the horse by a lazy, shuffling gait, which may be a short trot in which the horse fails to bring the hindhand under.

S. When the rider perceives that the hindhand is not brought under the body, he must conclude that he is shortening too much, is taking too much position, and should at once revert to regulating the gait, *i. e.*, driving forward with the thigh and taking less position, for he had passed to the more difficult lesson prematurely. It is the prerequisite for any trot that it be ridden actively, in order that the hindhand may gradually be placed under the body, as I told you before.

H. Then you would attain the perfect side pace, with the distance between the two trails as laid down in the instructions, at the same time with the perfect, shortened trot.

S. Yes, if both are attainable at all. If not, I content myself with that measure of side pace and shortening of the gait which the horse's conformation and development permit. For I make it a point, that a perfectly developed and regularly formed riding horse alone is capable of going a perfect side pace and trot with shortened gait.

H. Then you content yourself with a measure of side pace and shortening commensurate with the conformation and development of the horse.

S. Yes; and under certain circumstances, without any side pace,

and with a mere riding with position, and increasing and decreasing of the medium trot. For there are horses which can never go side paces, and yet must and can be rendered active for use in the cavalry. This is expressly stated in the riding instructions. Now, just as there are horses unfit for side paces on account of their conformation, so there are horses which can only go them to a limited extent, and with which the requirements of the instructions must be relaxed. It is preferable to ride little or no side pace rather than to demand one from a horse such as it is as yet incapable of going. I again remind you that a horse must be in possession of its full strength; if it is not it will be injured by the school trot with shortened gait, and by far the least number of our old remounts are strong enough for this purpose.

H. Then it is your opinion, that but few of our "old remounts" are capable of going the perfect regulation shortened trot and side pace.

S. If one of the sixty-five old remounts of a regiment is capable of doing it, it is an exception. Those whose conformation admits of it at all, have not their full strength until later.

H. Is it not, on the other hand, a doubtful measure to rest satisfied with a defective side pace as a means of instruction?

S. We must distinguish between a poorly ridden side pace and one not abreast of all the demands of the riding instructions. The latter may be ridden perfectly, but does not demand more from the horse than it can do. It will always be useful. It is only necessary that the shortened trot be ridden actively, that while in the position it is intended to give the horse, the gait be not shortened for the sake of position or side pace, but be increased and decreased for the purpose of bringing up the hindhand.

H. There are many men who refer to the side paces in general by saying that they let the horse "step over." But BALLY says, that his father, the celebrated equerry, ever declared any crossing of the horses legs a fault.

S. If the side pace, travers, renvers and schulterherein are to be ridden strictly according to the rules of the high school, and with perfection, then the horse's legs must cross, must step over. But the stepping over is not the object; it is a test of the degree of training. The main thing is the stepping under of the hind legs, the bending of the hindhand. The difference between the partial lesson well ridden, and the whole lesson badly ridden, is this, that the former, whether you ride with second position or with "one-sixteenths pace," or with a trifle more distance between the two trails, has

never any other purpose than the bringing under of the hindhand, the bending of the entire spinal column, the neck and the posture of the horse around the inner thigh. The latter rests content with a senseless, sideward staggering, in which the horse stiffens itself, does not become obedient, slips away its hindquarter and hurts itself with its hoofs. Any such side pace is wrong, whether due to the fact that the aids were faulty or that more was required of the horse than suitable to its degree of training or strength. Again I revert to my principal axiom: "*Rather no side pace at all, than one badly ridden.*"

H. But there certainly are some things which all campaign horses must learn, as closing up, dressing backward, turning on the hindhand, etc.

S. In what I just said, I had reference to the higher lessons, which are used in training as gymnastics, such as renvers, travers, schulterherein, trot and gallop, with shortened gait. The movements mentioned by you, we have for their own sake, for we need them in the drill in ranks. Any horse fit for use must learn and know them. Dressing backwards, it is true, serves for purposes of gymnastics as well as training, and should be used very discreetly.

H. I would like best to ask you to detail to me the whole course of remount training on the hand of the riding instructions.

S. What for? I could only say 'Yes and Amen" to everything in these instructions, and perhaps point out that it is necessary to comprehend their meaning to adapt oneself to every individual horse, and to advance in conformity with its capability and bodily development, and eschew adhering to the letter and stencil work drill. One point I will mention specially, leaving out of consideration the exercises which, the horse once thoroughly worked over, are necessary for cavalry, as for instance the use of arms, riding in the terrain, taking of obstacles, swimming, etc.; the essence of the whole riding course is the endeavor to produce a correct regulation long gallop, and the development of full speed.

H. ROSENBERG, in his "Chance Ideas," rejects full speed in the charge altogether.

S. You shall see in a moment how little ROSENBERG's and my ideas differ. When the horse is firm in the medium gallop, is up to the bit, and can increase and decrease the medium gallop according to the rider's will, the long gallop of 500 paces per minute should be diligently practiced, so that the horses can keep it up for some time, and feel at home in it, without losing their wind.

H. Not, I suppose, while confined to the covered hall?

S. Certainly not. The many corners would make many horses lame. It is to be practiced on extensive riding grounds with rounded off turns; individually at first, then two, three, four abreast, with intervals; also with distances to break any tendency to flurry, and, if they be well in hand, to instill a uniform drill pace. It should ever be kept in mind that more ground must be gained in the gallop than in the trot; for if the trot is sufficient, it is unnecessary to gallop. Whoever, at a gallop, does not experience a sense of safety and delight on his horse's back, needs force to retain his seat and control of the horse, will never experience success and delight in riding, and had better give up the idea of preparing a horse for the military service. It is only in the long gallop, with light touch of rein, that the attentive rider becomes aware of the influence of the seat upon the horse, its endurance, speed, confidence and ease. In the charge, in the shock, at full speed, the tactical action of cavalry culminates. Full speed must therefore be developed with much care and industry. The more practice man and horse have in the run, the more you can count on a well closed charge against the enemy. The closed attack is difficult to ride, especially outside of the smooth, level drill ground, and only when every rider has control of his horse. However much horses like to run, they do not like it in closed ranks, because of the absence of freedom of motion. It is only the power conferred on the rider by the training that prevails on the horse to do it. Full speed develops itself from the gallop. Whoever knows how to gallop, how to increase and diminish the gallop, can also ride full speed; whoever does not know how to gallop, whoever, as stated, is not a thoroughly instructed horseman, cannot ride full speed, for he cannot control his horse in the charge. Yet full speed frequently receives in the squadron the same stepmotherly treatment as the long gallop. The reason is, that neither horse nor rider are sufficiently trained for it, the former as regards independent seat, the latter because accustomed to the long pace. Neither will, therefore, have confidence in his own power. In the excitement over the unusual, the horses hurry, the cramped seat impedes the forward movement; some horses run away, others creep behind the bit and refuse to run. On the other hand, horses that have been made obedient, can go full speed.

H. In hearing you, one might believe himself to be listening to the doctrines of the steeple chaser.

S. Both kinds of riding, it is true, culminate in the long gallop and full speed. In the chase, the latter is the "finish;" with the soldier, it is the shock. The great difference is this, that the steeple

chaser leaves entire freedom to his horse's hind quarter, while holding neck and head low, guides it with both hands and good touch, careful to so select his way that the gallop step is not interfered with. When it comes to the finish, everything depends on getting the horse to develop its fullest speed. Whether, when and how the horse is to be checked after passing the finish post, is a matter of indifference. The military mount is to be guided by one hand, and should be capable, at any moment, of being turned short or checked with hind legs well under. It must, besides, be accustomed to carry itself, to look out for itself under a light rein; in the dense column, in line, in dust and smoke, it cannot select its way, nor can the rider select its way for it; in the evolutions, the latter's attention is too much engaged with other things; the horse must therefore be accustomed to jump suddenly high and wide without onset, and yet retain its balance. Last, but not least, in the charge the speed must be regulated by that of the slower horses, if the charge is to be as closed as required by regulations. The long gallop and full speed must therefore, in military riding, be ridden with more reservation. I believe I explained that to you once before.

H. Don't you think that this reserved full speed is the one demanded by ROSENBERG who rejects full speed and demands the hunting gallop for the charge?

S. I cannot dispense entirely with the full speed, the shock in the charge, if for no other reason than that of the moral effect on both sides. I remind you of ZORNDORF. In the charge against infantry and artillery, full speed is not absolutely necessary; it is against cavalry. I prefer to keep up the trot long, gallop for but a short distance, if possible, to get well under way, and command "March! March!" just before the collision. If you simply increase the long gallop, you produce laxity, which leads to the breaking of the front, and, in the most favorable case, to a doubtful hand-to-hand fight, which costs lives unnecessarily. I agree with ROSENBERG in so far as he rejects the short, jerky full speed, as it was formerly ridden and exhibited. But the full speed which we need for the shock, for breaking the opposing front, we cannot do without, and he wants it too. He simply calls the child by another name, and calls it full run. The reason why we see outside of the drill ground so many charges which are not closed, is that in the individual training of man and horse the ultimate object, warlike efficiency, the long gallop and full speed, were not kept in view.

H. I judge from all this that you are strongly opposed to the short gallop.

S. On the contrary. The short gallop, *i. e.*, the gallop with shortened gait is a good means of instruction to make the horse supple and flexible. It is a school pace like the shortened trot and all lessons on the double trail. These lessons should therefore be taken in hand only with horses of full strength and obedience. It should be ridden with much bending of the haunch and little ground should be gained; the more the hindhand squats and the higher the forehand gallops, the better. For campaign riding it is absolutely useless. If nothing were known of Prince FREDERICK CHARLES than that he prohibited the parade march in the shortened gallop, I should judge from that fact alone that he grasped the true rider spirit. As means to an end, however, the short school gallop is very good. It should therefore be taught by the best riders only, and practiced by them in individual riding. It should not be required by squads and by command, for even among the best riders of a squadron there are some who, led astray by their care for observing distance, resort to force or fail to notice when the horse gets behind the bit. It is difficult to ride it well and beneficially. Faultily ridden, it is harmful as any faulty lesson; hence it had better be omitted altogether. The gallop with shortened gait is not to be mistaken for the shortening of the gait at the medium gallop. Any rider of the squadron ought to be able to do that.

H. But you would require of the officers the gallop with shortened gait?

S. I fail to see why all the officers should not learn the entire high school for their own enjoyment, and I should be delighted if they all could. The same way I extend my patronage and feel gratified whenever they take part in races, especially in the chase. When they are able to do these things perfectly, they will perceive in what these branches of the art of riding differ from campaign riding, and how and in what particular the three branches must be kept separate.

H. It is getting late, and I have already plied you too much with questions. Permit me just one more. How many riders in a squadron do you mean to use for horse breaking?

S. Not a single man more than those in possession of the necessary qualification, as I stated before.

H. The four-year volunteers ought to present a good contingent, because they enter the cavalry from love to the horse, and in many cases have learned riding before entering the service.

S. Their number varies a good deal in the different regiments, and averages annually about fifty, or ten per squadron, in some regi-

ments only seventeen, or three or four per squadron. It ought to be gratifying to find one-half of them suited to the training of remounts.

H. That would make from one to three per year, that is, if they are available for remount riding in their second year of service, from three to nine altogether. How many non-commissioned officers do you think possess the necessary qualification?

S. One-half of them at the most; that is, seven.

H. The squadron will then, according as it has more or fewer four-year volunteers, have to train fewer or more conscript recruits, *i. e.*, from twenty-five to thirty-three. How many, from your experience, do you think will be sufficiently skilled for use as trainers during their second and third year of service?

S. Barely the fourth part of them.

H. Both contingents, then, would give the squadron from twelve to sixteen. With a large number of four-year volunteers this would give a total of thirty-four, with few volunteers. Taking into consideration detached service, promotion of four-year volunteers to non-commissioned officers, sickness, or other losses, the squadron might soon be unable to furnish a rider for each remount of the two contingents of thirteen horses, not to mention the horses that need re-breaking.

S. These figures do not shake my principles. It is absolutely necessary that the horses of the youngest remount class be trained by suitable riders only. If I had but three or four such riders in the squadron, I would rather let them ride three or four horses each daily, than put unsuitable riders on the young animals. The riding in the squadron will then show early progress, and in this manner in itself increase the necessary number of suitable riders. There is even some advantage in having the trainers ride more than one horse daily. For riding, riding, and again and again riding, is what produces good riders.

THE U. S. MAGAZINE RIFLE, MODEL 1892.

By Lieutenant JOHN T. HAINES, Fifth Cavalry, U. S. Army.

IN the *Army and Navy Journal* of February 23d, under the heading "Ordnance Notes," appears the following:

"Lieutenant H. C. Lyon, Seventeenth Infantry, is contributing to the *Army Herald*, Columbus Barracks, a series of articles on the new army magazine rifle; and in the latest number gives six principal faults, with perhaps more to follow. These are: 1. The twist should be from right to left, so as to avoid the blow on the cheek, given by the stock in firing, and to make the drift of the bullet toward the left, so as to counteract the natural "pull" of the trigger to the right. The Lebel rifle, of France, and most sporting rifles have their twist from right to left. 2. The rear sight is too far from the eye, is not properly graduated for the gun, and has no wind-gauge. 3. The magazine must be charged singly by dropping individual cartridges into it, entailing loss of time. 4. There is no apparent reason for each man carrying a ramrod, as the gun cleans itself, unless he can utilize it with his shelter tent. Each non-commissioned officer, however, should carry one, and it should slide into place easily and quickly, like the old Springfield, instead of being screwed in. 5. The cut-off lug should be bright steel or nickel plated, so as to be more readily observed by squad and company commanders. 6. There is danger in having cartridges "jam" in the chamber, especially if a soldier confused the two functions of the gun as a magazine and a single-loader."

A few of these criticisms exhibit such imperfect knowledge of the new rifle on the part of the writer that I am led to attempt to correct any erroneous ideas he may have given members of the Cavalry Association and the readers of its Journal.

Considering these objections in their order:

First. "The twist should be from right to left, to avoid the blow on the cheek given by the stock in firing," etc.

Experiments have shown that the blow referred to is caused by the recoil of the piece, and that there is no twist of the stock to the left due to that of the bullet to the right.

The recoil of the new rifle is less than one-half that of the Springfield.

As to the statement that a twist of the rifling to the left would counteract the natural "pull" of the trigger to the right, it is claimed that the rifle sufficiently provides for this very thing. The sighting notch on the cross-arm of the leaf is one-hundredth of an inch to the left of the axis of the barrel, so as to correct for drift at 500 yards, while that on the slide is two-hundredths of an inch to the left, correcting for drift at 1,000 yards; consequently for all distances under 500 yards the piece will shoot to the left; from 500 to 600 yards, slightly to the right; from 600 to 1,000, to the left again, and beyond a thousand to the right. Now, if from his experience at the last army competition, where it is presumed Lieutenant LYON became acquainted with the new gun, it was found to shoot to the right, his "natural pull" must have been considerable, except between 500 and 600 yards.

This "natural pull" should not be allowed for in a military arm. It will vary with the man. Some will pull directly to the rear, others to the right, and "shooters" say that there are others still who "pull off" to the left. Therefore, the only way to have uniformity or to attempt to do so, is to teach a man to pull directly to the rear. In sporting rifles, perhaps the conditions are different. The hunting sights are usually simple, without wind-gauge, and as the ordinary huntsman is not taught how to pull a trigger, he probably will pull more or less to the right, and the left-hand twist (with no drift correction) will somewhat counteract this—all this supposing the sportsman to be right-handed.

Nearly all modern military rifles have a twist to the right. The reason for this is hard to discover. In an old book written in 1859, I have found a reason for the left to right twist given by a commission appointed to investigate the subject of chambering, rifling, etc. It is, "that a twist from left to right is selected to counteract the natural tendency of a soldier to incline his sights to the left." In opposition to this, the author thinks the twist should be the other way, as the force of recoil or flinching from the recoil tends to bring the muzzle to the right, and the twist should be to the left so as to counteract this. None of this would apply now with the slight re-

coil of modern rifles. In fact, the subject of the direction of the twist appears to be of little importance.

Second. "The rear sight is too far from the eye, is not properly graduated, and has no wind gauge."

For ranges under 600 yards, the sight notch of the new arm is about two and one-half inches further from the butt-plate than that of the Buffington sight; from 600 yards up, it is only about a quarter of an inch beyond the notch of the latter sight.

The position of the sighting notch for the short ranges could be brought nearer the eye in three ways: 1. By using the slide notch for all ranges, and doing away with the steps. 2. By moving back the sight base an inch or more. 3. By putting a sighting notch on the top of the slide, where the leaf is flat, as in the old buck-horn sight.

If the first of these methods could be adopted with the present slide, the vertical distances, corresponding to a change of 100 yards in the shorter ranges, would be about one-twentieth of an inch, and the slide could not be readily adjusted. With the steps, if you come anywhere within half an inch of the distance, your sight will have the proper elevation. It is recommended by some "battle-sight extremists" that a fixed sight, correct for, say 350 yards, be used for all distances under five hundred yards, and that then the leaf should be raised and used.

In regard to the second of these methods, the moving back of the sight base, I would not do it. The piece has to be carried and handled as well as aimed. In action it would be carried naturally at the "balance," *i. e.*, where the rear rivets of the hand-guard are situated, and this can not be done if the sight is moved back. The base of the rear sight gets so hot after twenty-five to thirty shots fired rapidly, that it will burn the bare hand, and as there is just room enough now for the hand between the rear of the base of the sight and the forward end of the magazine gate, the very slight gain in accuracy at short ranges, would not compensate for the awkwardness and strain on the wrist occasioned by carrying the piece with the hand above the sight. There would be more danger, too, of burning the hand on the forward end of the sight base, holding it in this way, as the sight would be directly under the hand.

The third method suggested, viz: That of putting the notch on the top of the slide, as in the old buckhorn, is, I think, the best way of meeting Lieutenant Lyon's objection, in case it is acknowledged that a defect exists.

The graduations of the rear sight were not at first accurate, but the error was corrected by raising the front sight two-hundredths of an inch. The Inspector of Rifle Practice, Department of the Missouri, in reporting on the new rifle after the last army competition, states that the sight was much more accurately graduated in elevation than the Buffington sight. There is still room for improvement, however, and it is believed that when the carbine is issued the graduations on the sight will be correct.

There should be no wind-gauge until one is devised that will neither complicate the sight nor interfere with its usefulness at *all* times. It would be hard to improve upon the Buffington sight as a target sight, or to invent a worse one for field service of cavalry. The small field of view, the liability of the sight to be bent back or disabled by a blow from the front, the rusting or sticking of the wind-gauge and slide-binding screws, the loosening of the slide-recoil stud, the time necessary to adjust the sight, are its principal defects. Its advantage is great accuracy when you estimate the proper amount of windage, and have plenty of time in which to adjust your sight and find the object fired at, provided, of course, that you can adjust it, and that it has not jumped up or down since the last shot.

For field service, the new sight on the rifle will be a vast improvement on the old. It is a simple, stout, broad, open sight; it does not jump up or down during firing, and can be readily adjusted. For the carbine the principal objection to the sight is that the slide projects so far to the right as to make it liable to catch when the carbine is thrust into the boot.

Third. "The magazine must be charged singly."

Norway and Denmark, which use the Krag-Jorgensen system, both have a charger or clip, holding five cartridges, for the purpose of recharging the magazine. We have models, but for some reason none has yet been adopted in our service. With one of these chargers, the magazine can be refilled in less than three seconds. This time includes that of opening the magazine gate, taking charger from the pocket, loading and closing the gate again.

Fourth. "There is no apparent reason for each man carrying a ramrod, as the gun cleans itself."

Greater care than formerly must be taken in cleaning the gun after firing. The action of the gas during firing, and the residue of the smokeless powder after firing is such that the gun must not be allowed to stand for any length of time without cleaning. Rust forms if left even for a few hours. The barrel should be thoroughly

cleaned with a rag saturated with soda water, dried and thoroughly greased with cosmoline. Although it is true that the gun does clean itself, this way of cleaning is not to be recommended to the service, as accumulated rust in the bore would have a tendency to swell the barrel, if not to burst the gun. I have fired one of the new rifles a thousand times in three days without cleaning the bore or mechanism in any way, but this was done for the purpose of testing the capacity of the arm. There was a marked falling off in the initial velocity of the projectile when the weapon was fired for the first time after being left over night without cleaning; a ramrod, then, is a necessary article.

As to the manner of attaching the ramrod to the stock, a close examination of the method of putting on the knife-bayonet might indicate the reason for not having the ramrod held in place as it was in the old Springfield. In nearly all modern rifles the ramrod is screwed in.

Fifth. "The cut-off thumb-piece should be of bright steel or nickel plated," etc.

This suggestion is a good one, and has already been suggested to those having in charge the manufacture of the new arms.

Sixth. "There is danger in having cartridges 'jam' in the chamber, especially if a soldier confuse the two functions of the gun as a magazine and single-loader."

Any arm invented will jam if you try to introduce two cartridges into the same place at the same time. Human invention cannot very well overcome this jamming, but it is not the double-loading that is especially to be looked out for. The jamming that can be avoided is that which occurs after forcing a cartridge partly into the chamber so that the extractor does not seize it, then drawing back your bolt and forcing another in. In the latest model of our gun (the Norwegian 6.5 mm.) this danger has been overcome by cutting away the head of the bolt on one side, and extending the extractor-hook so far to the left, that as soon as the cartridge leaves the magazine its head is grasped by the extractor, and if then you withdraw the bolt, preparatory to pushing up another cartridge, you will draw back the first cartridge which will be thrown out by the ejector before the second one can be reached by the head of the bolt. This change could readily be made in our gun.

Having considered the criticisms of Lieutenant Lyon, I wish now to offer some suggestions myself. They are made with a view of attempting to improve the gun, and not with the idea of criticis-

ing merely because it seems to be the fashion to abuse the new rifle, which has had a hard time at the hands of the "kickers" ever since its issue. I have examined carefully the leading arms submitted to the Small Arms Board, and consider the new rifle superior to any of these for our service. There are, however, several small changes that could readily be made, and which would improve the arm considerably. These minor defects, discovered while arming the infantry, could not well be corrected then, owing to delay that would have ensued, and confusion of models, but as the cavalry has not been armed at all, and will not be until after May, a few, if not all of these defects, could be easily corrected before that time.

The following are some changes that, in my opinion, would improve the new arms:

First. Reduce the Weight. The first thing one notices on comparing the rifle with other foreign arms is that it is much heavier. The weight of our rifle is 9.4 pounds without the bayonet; that of the carbine 7.65 pounds; that of the best foreign rifles about 8.6 pounds, and that of the Berthier (French) carbine 6.6 pounds.

Now, although it is not thought that a rifle of our caliber and system can be reduced in weight to that extent, still it is believed that by gauging out and cutting off useless metal and wood, the weight of each of the arms can be reduced half a pound. In the new Krag-Jorgensen rifle of Norway, cal. 6.5 mm., useless metal has been removed, and the stock bored and gauged out in certain places, until it only weighs 8.7 pounds or under.

Second. Change the bolt-head and *extractor* so as to *prevent double loading*, as in the new Norwegian gun.

Third. Reverse the action of the cut-off so that when the thumb-piece is *down* the weapon can be used as a single-loader, and when *up*, as a magazine arm. Make the thumb-piece more noticeable by leaving it bright.

Fourth. (*a*) If any correction for drift is to be made, the sight should have this correction at 600 yards, and again at 1,000 and 2,000 yards. With this correction, eliminating other influences, one would shoot to the left of the target at all ranges under 1,000 yards, except at 600, and would not cross to the right between 500 and 600 yards, as with the present correction. This method seems better than having no drift correction at all, as it reduces the drift to a very small amount in all cases. Beyond 1,000 yards, a soldier will have more time to think about the probable error, than at the shorter ranges.

(*b*) The cross-bar of the leaf should be raised slightly, and a notch made in it for firing at 2,000 yards. As it is, you do not get full benefit of the length of your sight, as there is no notch on top, and besides, when the slide is at the 1,900 yards elevation, you can not sight through it. The 700 yard notch should also be made of some use. At present both the notches for 700 and for 1,900 yards are mere decorations.

Fifth. The outside and inside edges of the barrel at the muzzle should be rounded off. At present they are sharp, and any blow with a hard instrument is likely to turn the edges. If this should happen to the inside edge, the barrel would probably swell at the muzzle on firing; if to the outside edge, the bayonet could not be readily put on. The edges of the Springfield and all modern rifles are rounded in this way.

Sixth. The hand-guard should be extended to the rear over the forward end of the receiver, and its rivets countersunk, or done away with. The hand-guard sent out on the new rifle is almost useless. In firing, the rivets holding the springs and the forward end of the receiver soon get hot enough to burn, and so should be kept away from the hand. In the Mannlicher (Roumania), these rivets are done away with, and the springs fastened to the guard by means of small screws. The guard extends back over the forward end of the receiver also, and taken as a whole, it is the best type of hand-guard I have seen.

Seventh. In the carbine, the ramrod should not project beyond the stock, but should either be cut off and arranged as in the Berthier carbine, so as not to project at all, or it should be jointed and carried in the butt. As it is, the projecting end is sure to interfere with putting the carbine into the boot.

Eighth. In the carbine, that part of the sight-slide projecting to the right should be protected in some way or changed, and another slide adopted.

Ninth. The cocking-piece should be altered slightly so as to allow the safety-lock to be turned to the right when the piece is not cocked. This would lock the bolt and prevent its turning and becoming loose while handling the piece or while carrying the carbine in the boot. To lock the bolt as the piece is at present, the piece has to be cocked first, and consequently the main spring is kept compressed as long as the bolt is locked, and this, in the case of a cavalry command marching day after day, would not improve the condition of the spring. The Mauser rifle allows the safety-lock to be used at both times, as suggested.

The question of caliber and the ballistic properties of the rifle have intentionally been omitted from these remarks and suggestions.

The recoil of the new carbine will be about a pound and a half more than that of the new rifle, owing to the fact that the same ammunition is used and the weight reduced nearly two pounds. It will, however, still be about one-half what the recoil was in the old carbine. I refer to the theoretical recoil.

For the information of some, who apparently are not aware of the fact, the new rifle is known officially as "The U. S. Magazine Rifle, Model 1892," and not as the "Krag-Jorgensen."

SPRINGFIED ARMORY, MASS., March 1, 1895.

A HUNDRED VERSTS' (66.3 MILES) RACE.

By Lieutenant H. T. ALLEN, Second Cavalry, U. S. Army.

ON February 15, 1894, there occurred in the vicinity of Moscow, an officers' ride of 100 versts, which was undertaken with the avowed intention of affording a test of speed. This ride, which attracted the attention of all interested in military sport, was organized by private subscription between the officers taking part. As notice concerning it had been sent out only a week in advance, and as many of the horses had not been trained, there were only nine participants. Of these nine, one came from the Horse Guards, three from the Guard Ataman regiment, one from the Guard Lancers and four from the Guard Hussars.

The conditions governing the contest required the start and finish to be at the Moscow gate, the route lying through certain specified villages and including two hills. English or cavalry saddles were to be used, the riders being at liberty to choose their own gaits, to halt and to dismount as they saw fit. Judges were appointed for the purpose of observing the race and the relative order of the contestants. To avoid interference and unnecessary worry to the horses, it was arranged that the riders should start in pairs at fifteen minute intervals, the first pair starting at 7:30 A. M.

The weather contributed to the success of the race, the temperature being 23° F. in the morning and growing sufficiently warm to melt the snow somewhat by 3 P. M.; there was little wind. The day was clear and bright and the roads good. The straightness of the road permitted the riders to be seen by the judges a long distance off, and while the roads were, on the whole, excellent and easy on the horses' feet, it was observed that in places the snow somewhat impeded rapid progress.

To witness the arrival, the judges assembled at the gate at 3 P. M. Among them were Major-General Prince Wassilemikov, commanding the Guard Hussars, and Major-General Grekov, commanding

the Guard Ataman regiment, and also a number of officers of the Guard Cavalry.

"Georgetta," a gray mare from the Yanov government breeding farms, half-blood, eight years old, arrived first and quite fresh, having made the distance in seven hours seventeen minutes and ten seconds. The next to come was "Grad," a light bay Anglo-Arabian stallion, eight years old, from the Strelitz government studs, he arriving at a remarkably brisk canter in seven hours and nineteen minutes. The third to arrive covered the distance in seven hours and fifty minutes. The slowest, a dun gelding, nine years old, made the distance in nine hours and nineteen minutes. One of the horses, a thoroughbred, gave out at the sixtieth mile, and had to be led.

Besides the interest of the owners in trying their horses on a long distance ride, this race affords a general interest in the comparison of the breed and the training of the animals. Freshest of all, as was ascertained at the finish, when a 1,200 yard dash was made at full speed, were the Anglo-Arabian stallion "Grad," and the half-blood mare "Georgetta." An English half-blood and an Arabian thoroughbred also arrived fresh. The above horses had been well trained for the work, and had been fed twenty quarts of oats daily previous to the race. Two days before the race "Grad" had made forty-six and one-half miles in six hours; he had also been ridden a little the evening just before the trial. The tired thoroughbred was but little trained, although exercised every day, was of a capricious and stubborn disposition, and could never eat more than fourteen quarts of oats per day. He received only eleven and one-half quarts daily before the race. Moreover, in consequence of the narrowness of his hoofs, much snow clung to them, and impeded his progress. Last came the "Don" horse, which had scarcely been ridden at all before the race, and which never ate even eleven quarts of oats per day. The other horses made a normal speed of about eight miles per hour, due to excess of fat and irregular riding.

The leading horses traveled so that the first eight miles were made in forty-five minutes at a trot and walk, as follows: Two and two-thirds miles at a fast trot, then 1,200 yards at a walk, then three and one-third miles at a trot, 600 yards at a walk, and a mile at a fast trot. In ascending the hill the rider dismounted and led. The next eleven and one-half miles were made in an hour and a quarter, observing the same order of gaits; then followed six and one-half miles at a slow trot, two and one-half miles at a field gallop, and one and one-third miles at a trot. The road here was very bad; there were deep ruts in the middle, and considerable snow on the sides.

When the ride was about half completed a little hay was fed—"Georgetta" resting about ten minutes for this purpose, "Grad" five, and the others two. The next six miles were traveled at a field gallop, and all the horses were given a drink of water. The horses now grew visibly tired, "Georgetta" having to be urged very often; "Grad" went easily at a trot, although often breaking into a gallop. At the sixtieth mile one of the horses stopped, and, in spite of vigorous urgings, refused to go on. "Georgetta" soon fell behind and "Grad" went on alone at a very slow trot and a hand gallop. The last 1,200 yards were made at full speed, "Georgetta" in the lead.

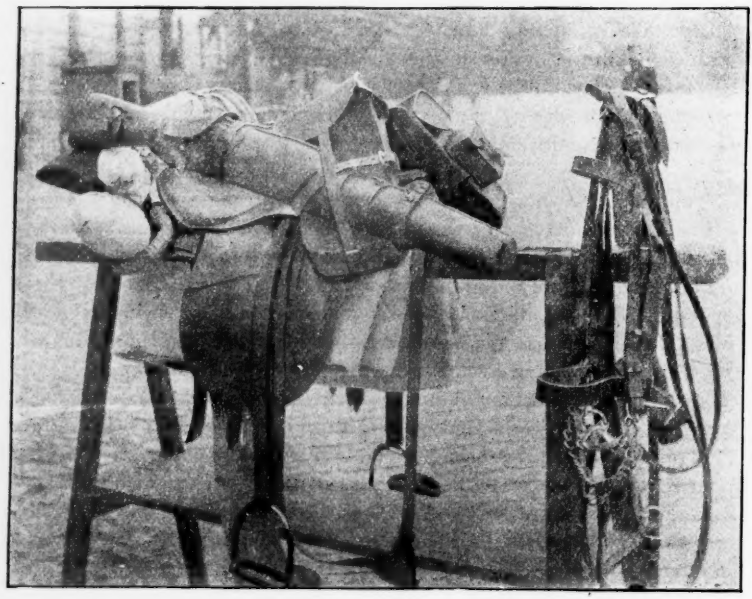
Strictly speaking, such results might have been expected. Of the three horses mentioned, two were well trained, the third badly trained and badly fed, all of them being of good blood—two English and one Arab. The most energy was shown by the Arab, "Grad," which required no urging, while the others had to be urged, and even whipped. The "Don" gelding was also interesting. He went on comparatively slowly—slower than any other with loose rein—moving his feet most phlegmatically. Instead of going at full speed at the finish, he scarcely answered the call of his rider. In general, his want of blood was shown by the apathy of his movements; his want of training, by his slowness and great fatigue.

This competition is the first experiment here of a long distance race for speed. Every cavalryman, and even non-cavalryman, knew that a horse could make 100 versts in a day, but experience was necessary to know the number of hours required and the gaits to be adopted, with a view to preserving the strength of the horses. Although the experiment was dangerous for the horses taking part, considerable love of sport and emulation were shown in this trial. The minimum time required was seven and one-fourth hours, and it may be considered almost impossible to cover the distance in less time without wearing out the horse, a thing unworthy of a cavalryman.

It is unfortunate that this race was not more carefully organized. It ought to have been arranged earlier, in order that those taking part might have had time to prepare their horses for it, and judges ought to have been posted, if possible, at every cross-road. During this race two competitors lost their way, one of them making six and one-half miles more, and the other less than the one hundred versts, so that both lost all claims upon prizes. Finally, the horses and riders ought to have been weighed before and after the race, and a weight allowance ought perhaps to have been adopted. Under these conditions such a race would have awakened a much greater interest.

PROFESSIONAL NOTES.

The manner of carrying the arms and equipments in the German cavalry has been much discussed and not intrequently criticised. The illustration shows the packed saddle with the carbine strapped across from cantle to pommel in a way to wedge the leg of the rider under it, as heretofore required.



The following instructions from the Emperor changing the regulations, have recently been published:

[Copy.] TRANSLATION.

WAR MINISTRY, BERLIN, January 17, 1895.

I HEREBY ORDER —

1. The cavalry carbine will be carried suspended from the saddle, perpendicular to the ground, behind the right thigh of the trooper, and the sword suspended from the saddle behind the left thigh.

2. The lower ring on the sword scabbard and the corresponding strap on the belt will be dispensed with, (be no longer regulation).

3. For the better arrangement of the trooper's clothing on the horse, canvas pockets to be adjusted to the lower side of the saddle-bags will be adopted.

4. The alterations and new equipments will be according to the pattern submitted to me, and to the available means. The War Ministry will take the necessary steps to carry this into effect.

NEW PALACE, January 10, 1895. WILLIAM.

BRONSART VON SCHELLENDORFF.

To the War Ministry.

The last annual report of the commandant of the U. S. Cavalry and Light Artillery School has just made its appearance. It is prepared by General JAMES W. FORSYTH, who recently relinquished command of the school upon his promotion. This school is of such vital interest to the cavalry arm that it is deemed advisable to present extracts from this report. The experience at Fort Riley is in no wise exceptional as regards the difficulties encountered in establishing a service school in the United States. The histories of the Military Academy at West Point, the Naval Academy at Annapolis, the Artillery School at Fortress Monroe, the Infantry and Cavalry School at Fort Leavenworth, and the Naval War College, are all replete with disheartening difficulties arising principally from indifference and want of appreciation on the part of those in authority, who have the power to vitalize the efforts of the commandants of these various institutions. The growth of these establishments has been slow, gradual, and in opposition to innumerable obstacles. Everything connected with their advancement has been forced along lines involving compromise and expediency at every step. There is nothing akin to the wonderful establishment of the Chicago University or the Leland Standford University of California. Men of wealth and owners of fine libraries do not remember these struggling institutions in their bequests of money or books. The generous will of the late General CULLUM provided the first gift of importance to West Point at a comparatively recent date. The lack of funds in schools of application is more seriously felt than in ordinary academies, for experimental and practical outdoor work require expenditures for material far in excess of the needs of schools conducted principally on the line of theory.

The conditions surrounding the army in the United States have been gradually but completely changing for many years past. While courage and aptitude for the profession of arms will, in the future as in the past, exercise a marked influence upon the fate of any people, modern science demands that those who connect themselves with the

military or naval service of any great nation shall acquire a familiarity with a multitude of inventions and improvements beyond the wildest dreams of the squirrel rifle age in America. It is impossible in these modern days for any one individual to perfect himself in many branches of even a single profession. It is then to the commandant and staff of the various schools to whom the government must look for schemes of instruction fitted to the needs of the country. Experience from day to day is a better guide to perfection than any other method in the cases of post-graduate schools, because the students are, as a rule, men of education and ability, and interested in everything connected with the elevation and advancement of their own arms, as well as the service in general. It is a matter for regret, therefore, that all recommendations cannot be passed upon promptly, and habitually with approval, and a supply of funds usually necessary to give vitality to most proposed improvements.

EXTRACTS.

"The schemes of instruction and detailed orders for the government of all cavalry instruction and of combined exercises were printed in extenso in last year's report. The work done this year was so similar in all respects to that of last season, it is not considered necessary or desirable to republish those schemes or orders, but as the character of the benefit derivable from field exercises is quite clearly indicated by the comments upon combined maneuvers, published to the school this year, they are here reprinted in appendix 'C.'

"The plan it was intended to pursue with reference to these comments was to print and distribute them to the command. Once a week all officers were to be assembled, and after the reading of orders, reports and comments upon each exercise, discussion of the same was to be had.

"I cannot close this report, however, without inviting attention to what I believe to be a most important auxiliary to success in deriving a maximum benefit from field exercises, namely, their thorough and proper discussion after execution.

REMARKS AND RECOMMENDATIONS.

"Except as a record of experience for the information of successors, the making of recommendations in printed reports seems of little utility. Pursuant to the provisions of the order establishing the school, I last year thus set forth its wants, but so far as I am informed, no results were consequent thereupon, nor have I yet learned whether the recommendations made and the system of instruction outlined therein met with the approval of my superiors or the reverse.

"Recommendations frequently and repeatedly made have seemed to exercise no influence, and serious impediments to the success of the school have continued to exist and to repeat themselves. The most serious of all is the continuous lack of sufficient officers for efficient instruction, and the apparently unnecessary detached service of officers and organizations. On several occasions the number of officers available for duty with troops was so small that officers' patrols were necessarily sent out under non-commissioned officers.

"Twice within twelve months the same squadron was sent on detached service in the midst of the school season, thereby greatly decreasing any benefit which might possibly have been derived from a complete and systematic course of instruction.

"This circumstance would not be mentioned here were it not for the fact that in both instances there was, at a neighboring post, a squadron of cavalry which was apparently available for this detached duty, and not engaged in any special course of instruction.

"Since the school existed, troops composing it have never joined at the season of the year which has been recommended by the commandant and

approved by the War Department, but have been ordered there at all seasons, irrespective of the effect upon their instruction. The first squadron to join after the school was established, after having been sent on detached service twice within one year, was relieved long before its legitimate tour of duty had expired.

"In other words, the interests of the school appear to be assigned a position subordinate to most other considerations incident to the service.

"Such conditions are not calculated to encourage those charged with the welfare of a young institution struggling for recognition commensurate with its importance to the service, and it is useless to expect any satisfactory amount of success as long as this policy is maintained in the treatment of its affairs.

"It will ordinarily be impossible to find four troops of one regiment so situated as to make it both desirable and convenient to order them to the school, and it will doubtless never be convenient for any regiment to furnish twelve officers for duty with four of its troops.

"The difficulty of getting troops changed with regularity and at the proper season, and of keeping a sufficient number of officers on duty with troops, will therefore probably continue as long as the present system of constituting the cavalry personnel is maintained.

"It would be comparatively easy to annually find several troops (no more than one to be taken from any regiment) that could be conveniently ordered to the school, and any regiment can generally, without embarrassment, furnish three or six officers for duty with one or two of its troops.

"The above mentioned difficulties would, therefore, be encountered much less frequently, if ever at all, were my recommendation of last year adopted, namely, that but one troop be taken from each regiment until twelve, instead of eight troops are stationed at the school, when two of the regiments should furnish two each. These troops could also then be raised to a war strength, another very desirable consideration which has been previously represented, without a serious reduction in the strength of other troops, and field officers could be detailed from the entire list, thus securing those most suitable.

"I will also here renew a recommendation that I have several times made, in one form or another, that officers assigned to the cavalry branch of the service be permitted to perform their first year of service at this school. It seems especially appropriate that additional second lieutenants be given their first service there, as it can not be known to what regiments they will finally be assigned, and Fort Riley is as central a point from which to order them to permanent stations as any that could be found. They could be attached for duty to regiments having troops in the school.

"If all officers assigned to the cavalry could not be ordered there for one year's duty, at least a sufficient number should be sent to enable the commandant to supply each troop with three officers for duty at all times. They will derive far greater benefit than from service at an ordinary post not possessing such facilities for instruction as exist in a large command. The starting of a young officer with proper ideas of his duty is of great importance.

"As the matter of expense has seemed to be a first consideration in the changing of troops on duty at the school, I would respectfully submit a further modification of previous recommendations with a view to decreasing said expense. Instead of changing troops every three years let each tour of duty be the regulation four years. It would then be necessary to change but two troops each year as long as only eight are in the school and three per year when it consists of twelve. In order to give as many officers the benefit of the course as possible, however, it is thought the subaltern officers should be changed every two years if this recommendation be adopted. Two years is sufficient for an officer to obtain whatever benefit is derivable from the course of instruction.

"A large clock with sweep second hand for timing horses at the regulation gaits, and a large mirror for making plain to unskillful riders faulty positions unconsciously assumed, would be useful adjuncts to riding hall instruction.

"The rendering of reports upon field exercises and maneuvers requires

time for their proper and careful preparation, and is a most important feature of the instruction. There should, therefore, never be had, in my opinion, more than three field exercises or combined maneuvers per week. It is believed that from twelve to fifteen of each of these, and six regimental and three brigade drills are all-sufficient for efficient instruction. The period from September 15th to December 1st would afford from fifty to sixty working days, ample for the requirements of the above instruction, and allowing some for the possibility of loss through bad weather or other emergencies. Ceremonies could continue with good weather, or such days as were suitable to December 20th, could be utilized for matters which had been crowded out during the season by accidents and exigencies of the service. As a rule, however, I believe it for the best interests of the service that all school work should be completed by December 1st.

Extracts from comments published to the command upon combined maneuvers at the school during November, 1894:

"The Blue Battery unlimbered on that slope of a hill which was next the outlined enemy, and stood on top of the crest firing, entirely exposed to the assumed fire of the enemy. It should have unlimbered on the reverse slope, and running guns forward, stopped as far behind the crest as possible, and still be able to fire over the top. Horses, limbers and caissons should always be afforded all protection practicable, without sending them so far away as to interfere with prompt service of piece.

"The primary duty of advance guards is to push the enemy back, and by a continuous forward movement, to avoid delaying advance of the main body. The reserve and battery were slow in following up the retreating enemy. The battery, after causing the enemy to retreat, remained in position still firing at him, long after it should have been limbered up and in pursuit.

"The leader of the extreme advance point continued to advance with only four men on a flag representing a troop, instead of rejoining his troop after having advanced to within dangerous proximity of the enemy.

"The officer in charge of the flags several times stood still receiving charges, instead of either making a counter charge or retreating in good season. The flags were also allowed to bunch up when they should have been kept as far apart as the requirements of the tactical units represented would necessitate if actually present."

"It should be understood that a commander fails in taking advantage of all his opportunities, who fails to avail himself of all the cover obtainable without a violation of his orders, and that no exposure should be incurred which is not necessitated by orders or plans.

"Whenever it does become necessary to expose commands to fire, it should be done at a rapid gait, and if practicable, in open order.

"Signal men, in sending messages to the rear, took positions so exposed that messages sent could be read by the enemy as well as by their own force. Flags were also carried unfurled, making the bearers conspicuous marks, and unnecessarily disclosing the position of their own side.

"A tendency was observed on the part of flankers and points to remain practically stationary, and in exposed positions, while being fired upon by dismounted patrols and flankers of the opposite party. A great deal of mounted firing was also uselessly indulged in. Such fire, at any but very close range, is mainly useful to warn friends of the near approach of the enemy.'

"For purposes of instruction it would have been better had the flags been maneuvered less rapidly. The gait was so rapid and the simulated action so fast and furious as to afford no opportunity for well considered and orderly dispositions, or for systematic and harmonious operations controlled by orders from the commander of the rear guard. The maneuver was therefore practically void of results in the way of instruction, but might be considered an indication, to a slight extent, of what the rear guard of a badly defeated and routed army might ordinarily have to expect when pursued by fresh cavalry of a bold and victorious enemy.

"The results of maneuvering with an outlined enemy have never been what was hoped for, and it seems as if our attempts in that line are destined to result, as they have wherever thus far tried, in disappointment.

"Even had the gait been less fast it is doubtful if much better results would have been realized. Charging with flags was demonstrated to be of doubtful utility, and it is believed that about the only way to secure systematic and orderly operations with an outlined enemy is to have both friends and enemy controlled by one commander. In this manner, after sending a flag to a certain position to represent a hostile force, dispositions could be made with deliberation, and executed with precision. This particular feature completed, another could likewise he planned and executed. This, however, would amount to but a little more than training in battle formations and in methods of approach and attack, an instruction which seems a trifle elementary for our purpose."

"It is thought too much dismounted action was indulged in, and one Brown troop was observed holding their led horses on the skirmish line. This tactical formation is of slight utility under any circumstances, suitable principally to emergencies and exceptional circumstances Whilst comparatively flat crests might offer some protection to men in such formations, their horses would be entirely exposed.

"The led horses of the support to the battery were at one time placed about 100 yards immediately in the rear of the battery, an exceedingly faulty position, when the battery is under fire. As a rule, a protected position on the most exposed flank should be chosen if practicable."

These exhibits are from comments made by General FORSYTH; others are by Colonel CARPENTER, director of the Cavalry School. The day is not far distant when the army will be deprived of the valued opinions of officers who have had the benefit of the experience obtained in the War of 1861 to 1865, and the annual publication of their criticisms, made upon maneuvers executed at the schools or camps of instruction, cannot have other than a beneficial effect upon the younger generation, which must at no distant period compose the great bulk of the army, officers and men.

The following letter was recently received at the headquarters of the Seventh Cavalry, and at a meeting of the officers subsequently held, it was unanimously agreed to accept the painting of "Custer's Last Fight" on behalf of the regiment. The painting originally cost 88,000, and was exhibited in all the large cities in the West during a period of several years. There could be no more fitting home for this painting than with the headquarters of the regiment, so many of whose officers and men found a soldier's grave near the Little Big Horn on the 25th of June, 1876:

"ST. LOUIS, February 13, 1895.

"*Colonel E. V. Sumner, Colonel Commanding the Seventh U. S. Cavalry Regiment:*

"SIR:—A few years ago we came into possession of the famous painting, "Custer's Last Fight," painted by CASILLY ADAMS. This painting represents, as you are probably aware, the last moments of the famous leader of your gallant regiment in the battle in which he lost his life, and it has long been the intention of our President, Mr. ADOLPHUS BUSCH, to present this painting to the Seventh U. S. Cavalry.

"In his opinion it is eminently proper that General CUSTER'S regiment should be the possessor of the painting which commemorates the death of its famous leader, one of our foremost cavalrymen, and also one of the most im-

portant frontier battles, representing an episode in our frontier history which is not exceeded in importance by any like event.

"We now have the honor to offer to you for the Seventh U. S. Cavalry Regiment this painting, reserving, however, the copyright of the same, which was given to an engraving company in Milwaukee, which intends to reproduce the painting.

"We trust that you will accept our offer, with our best wishes and compliments, on behalf of your regiment. If you do, then please inform us to which place you desire to have the painting forwarded, and we will send it as soon as we have it ready for shipment.

"Assuring you of our high regard, we are, sir,

"Very respectfully,

"ANHEUSER-BUSCH BREWING ASS'N,

"(Signed) C. E. SOEST,

Corresponding Secretary.

When the new cavalry bit was adopted, known as the 1892 model, the Chief of Ordnance published a circular requesting reports upon any defects found in the bit. It has now been in use for nearly two years, and it is presumed that its qualities are now well established in the minds of officers. There is little doubt but that the new bit is an improvement in many ways over any heretofore issued, and that such defects as exist are of a minor nature, and may be corrected without changing the model. It is believed that the upper branch was originally planned and should be a trifle longer. The error evidently occurred in measuring from the center of the mouth-piece rivet to the *center* of the upper ring, instead of to the point where the curb chain hook should be attached, as contemplated by Major DWYER. This undue shortness of the upper branch causes the bit to have a tendency to "fall through," and also enables the horse to turn the bit upside down. This last named occurrence happens at drill nearly every day in an average troop.

Perhaps some readers of the JOURNAL may be able to describe their experiences with the bit, and thus determine if these minor defects have been generally observed, and require correction. The broad curb strap was adopted some years ago to lessen the liability to broken jaw, and other injuries arising from a severe use of the Shoemaker bit. It is possible that experience with the new bit may render a change in this respect desirable.

One result of the recent strike in Brooklyn has been to educate public opinion in this country on the use of cavalry in quelling riots. The value of mounted troops for clearing streets has long been recognized in Europe. Experience has shown that streets may often be cleared by mounted men without shedding blood, whereas infantrymen are frequently compelled to use the bayonet, and sometimes to fire upon mobs before any impression can be made upon them.

In this connection it is pleasing to note that Captain CHARLES F. ROE, whose good service with Troop "A," New York National Guard, was highly praised on all sides, has been promoted to the

grade of major, and authority granted to him to raise another troop. This will give him a squadron, consisting of two troops of seventy-five men each, composed of as fine material as exists in the United States or elsewhere.

The following order was issued by Brigadier-General JAMES MCLEER, which is believed to voice the sentiments of the entire law-abiding community:

"The brigade commander feels that he cannot speak too highly of the conduct of the troops under such trying circumstances. Where all of both brigades did so well, he hesitates to mention particularly any organization, and yet he feels he but voices the sentiments of all law-abiding citizens when he offers special thanks to Troop "A," of the First Brigade, and its gallant commander, Captain CHARLES F. ROE, for distinguished services during its tour of duty in Brooklyn."

NO MONEY FOR MORE MOUNTED TROOPS.

The dampening but not discouraging intelligence has been telegraphed from Albany that Adjutant-General MCALPIN refused the application of a number of Buffalo horsemen for enrollment in the National Guard as Troop "B" of mounted cavalry. The Adjutant-General is reported to have said there is no money in the treasury, either to uniform or to meet other expenses of mustering in the new troop. Should a new troop be needed Brooklyn's claim will be considered first.

Brooklyn, by the way, is most eager to form a troop, and *The Rider and Driver* would urge upon General MCALPIN to devise some means by which the necessary money may be obtained. From what we have seen of the value of mounted troops in riots, the suppression of which seems to be the principal duty of the militia, the idea occurs to us that a troop of lancers would be most effective. A charge by such a body of men would clear a street "pretty quick." —*The Rider and Driver.*

ESSEX TROOP'S NEW ARMORY.

Essex Troop of New Jersey has purchased the Roseville Riding Academy. An addition will be built to the academy, making a large armory with social rooms, dressing rooms, and a large hall on the third floor for dismounted drills. Thirty thousand dollars has been subscribed for the purpose. The proprietors, Messrs. GEO. HILL and BENJAMIN MCKEE, have made arrangements with the troopers by which they may have the arena certain evenings of the week, in order to continue their public business.—*The Rider and Driver.*

The death of General PHILIP ST. GEORGE COOKE, at Detroit, on March 20th, deserves more than a brief notice in a journal devoted to the interests of the cavalry arm in the United States.

General COOKE, at the time of his death, was eighty-five years

old. He was graduated at West Point, July 1, 1827, and entered the service in the Sixth Infantry. He served on the frontier from Fort Snelling to the Arkansas River, and participated in the Black Hawk War prior to his promotion to first lieutenant of the First Dragoons, when that regiment was organized in 1833. His service in the cavalry began, as it were, at the birth of that arm in this country; the more than sixty years which have elapsed since that date have developed many excellent officers, but not one who has been held in higher esteem as a *beau ideal* of a cavalry officer and gentleman. His professional career has extended much beyond the average length of life, and includes an infinite variety of service throughout the Western country.

He participated in Indian and exploring expeditions without number. In the wonderful march of General HARNEY'S command, from Fort Leavenworth to California, in 1846, he was detached to move down the Rio Grande and to find a practicable route to the West; he succeeded, and his trail was subsequently known as the old Cooke Road, and was used as a mail route until the building of the Southern Pacific Railroad along the same line put an end to its usefulness.

He served in California after its occupation, but was promoted to major Second Dragoons, and joined the army in Mexico; upon the close of hostilities there, he was ordered to Carlisle Barracks, Penn., as superintendent of recruiting service.

The large Sioux expedition of 1855 found him back on the Plains in command of the cavalry portion of the column. He was employed in Kansas during the trying disturbances of 1856 and 1857, and when the Utah expedition was organized, he was assigned to command the cavalry.

He was promoted to colonel Second Dragoons in 1858, and soon after prepared his cavalry drill book, which was adopted in 1861.

Upon the outbreak of the Civil War, General COOKE, a Virginian by birth, remained loyal, notwithstanding his son, General JOHN COOKE, and his son-in-law, the celebrated cavalry leader, General J. E. B. STUART, both joined the Confederacy. During the Peninsula Campaign he found his command opposed at Gaines' Mills by troops commanded by his son-in-law.

He was brevetted major-general for services during the war, and was retired after forty-six years of active service. His career furnishes an example of loyalty, professional rectitude, and conscientious devotion to duty in its highest sense, which may well be followed by young officers.

BOOK NOTICES AND EXCHANGES.

HORSES, SADDLES AND BRIDLES. By Captain William H. Carter, Sixth Cavalry, U. S. Army. Ketcheson & Reeves, Leavenworth, Kansas, 1895.

In theory the cavalry officer should be a man versed in everything concerning the horse, and the fact that he is not presents one of the anomalies of our system of military training. Until recently our most favored officers, not being selected on account of any special aptitude, and often being city-bred youths, without a knowledge of horsemanship beyond that taught at West Point, were left to themselves to pick up all the little details of service outside of drill and riding. They were not told what they should know or where they they might learn, and as few men will ever acknowledge that they do not know everything about a horse, the result was not good. A certain human weakness, or dread perhaps of the criticism of wiser men, often prevented the young sub from taking the troop farrier into his confidence and spending a few hours at the picket line each day, trying to study the age, ailments, moods, paces and gear of the animal which, more than his weapons or his art, will influence his career. Under such circumstances many remain ignorant, others seek the truth, and a few have the benefit of early practical experience, but none have had a systematic course mapped out for them.

Some reasoning such as this must have impelled the early organizers of the United States Infantry and Cavalry School to coin the word Hippology and to choose as text books the English works of Fitzwygram on "Horses and Stables," and Dwyer on "Seats and Saddles, Bits and Bitting." The first of these is suited to a different climate from ours, gives the management of the stable of an English hunting squire, and tells you the tricks of the English groom. The last is discursive in its style, is filled with strange jokes, and follows a literary model that has disappeared from horse books. Both are suited to the English thoroughbred, and neither was intended to be a text book.

To replace these books, and to give information on subjects which are now acknowledged to be a necessary part of the professional equipment of a cavalry officer, is the object of Captain Carter's

book. For instance, the chapter on "The Cavalry Horse," giving the conformation and the examination for soundness, should remove all doubts as to what is desired in an animal destined for service in the ranks. A study of the chapter on "Diseases and Injuries," should make one feel at least on an equal plane with every old soldier in the troop, in matters which call for his decision every day. The comparison of our equipments with those of other nations is interesting, and shows that we are, in some respects at least, better off than they are. The chapter on "Forage" ought to be of use to many a board of survey, which is all too often at the mercy of a contractor.

These things, and many others, ought to recommend the book to the service. After what we have had, even a poor book ought to be joyfully accepted by our service, but "Horses, Saddles and Bridles" is so well suited to our use, fills so many gaps in our cavalry literature, is so fully illustrated, so well written and arranged, that its success is assured.

EBEN SWIFT,
Captain Fifth Cavalry.

NAPOLEON BONAPARTE'S FIRST CAMPAIGN. By Lieutenant H. H. Sargent, Second Cavalry, U. S. Army. Published by A. C. McClurg & Co., Chicago.

"Napoleon Bonaparte's First Campaign" is the title of a recent addition to the Napoleonic literature, that deserves a good reception. The author, who is a most enthusiastic admirer of the Great Captain, describes the events pertaining to his subject in an interesting and instructive manner; and while his work will doubtless be entertaining to the general reader, it is valuable chiefly as a study of scientific war as conducted by the greatest leader of modern times in, possibly, the most instructive campaign on record.

The author states clearly the main features of the campaign—those necessary for his purposes—and refrains, wisely it is thought, from narrating anything else. His deductions are thus placed in the clearest light, and are not obscured by a mass of details, which, however interesting, would serve only to divert the reader's mind from the main point which it is intended to illustrate or to prove. Conciseness and accuracy of narrative are followed by fairness in reasoning, and soundness in deduction; and the conclusions deduced are still further supported by quotations from such eminent authorities as Jomini, Hamley and others, including Napoleon himself. The scientific character of the work may be inferred from the fact that more than one-half of it is devoted to discussion and analysis.

W. A. S.

THE MILITAER-WOCHENBLATT.

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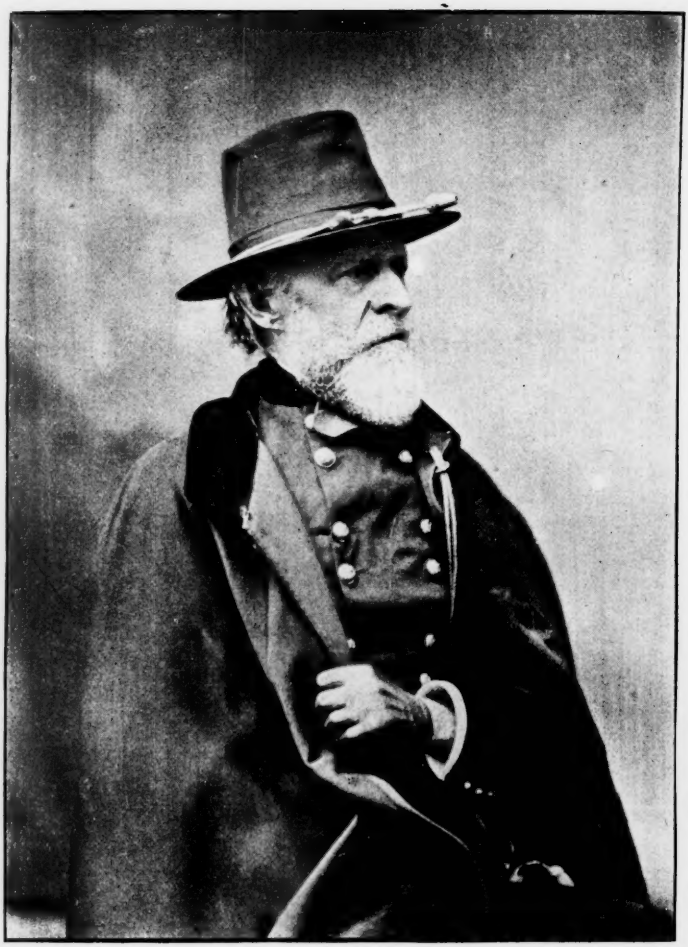

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